EARLY FLOODS IN LOS ANGELES COUNTY

James F. Reagan

County Flood Control Engineer

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REA

EARLY FLOODS IN
LOS ANGELES COUNTY

Notes By

James F. Reagan

County Flood Control Engineer

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Colton, C. E.	262

TROPICO

Ayers, Ed.	146
Hunter, Samuel	221

RIVERA

Patton, W. R.	20
Germain, A.	20
Coffman, F. A.	32
Cate, D. W.	185
Gooch, T. L.	188
McLane, Thos. F.	191
Passons, Tom	193
Trigg, J. E.	201
Montgomery, J. A.	203
McGaugh, P. G.	215
Hunter, Jesse	258

NORWALK

Mason, C. C.	144
Bremond, C. G.	159
Hay, James	177
Johnson, D. D.	180

Young, Chas.		187
Sproul, W. C.		190
McGaugh, M. J.		221
Truitt, E. P.		223
Elliott, J. S.		223
Hughes, W. H.		223

WATTS

Ruiz, Jose		?

NEWHALL

Thornburg, Chas. H.		36

LANKERSHIM

Brooks, R.	1 mile east on Central Ave.	63

POMONA

Vejar, F. Z.	North Park	68

BEVERLY

Cottle, W. W.	615 Canyon Drive	69

ARCADIA

Unruh, H. A.		81

PUENTE

Newland, Wm. N.		77
Silva, Jose		267

EL MONTE

Temple, W. P.	just west of Old Mission Bridge	268
Dodson, W. R.	Lexington Road	151
Durffy, J. S.		152
Parish, Keno		176
Dodson, Mrs. W. R.		190
Thurman, S. D.		246
Guess, John		249

SAN FERNANDO

Wilson, J. T.		165
Lopez, Mrs.		173
Barclay, J. H.		227

DOWNEY

Pratten, A. B. P.	168
Hutchinson, Tom	208
Lane, George	210
Townsley, John	210
Quill, Jim	211
Burke, Frank	212
Tierce, T. R.	249
Brookshire, J. S.	260

COMPARATIVE SIZE OF FLOODS

Mason, C. C.	144
Sanchez, Tom	145
Ayers, Ed	146
Sanclair, Fred	147
Fisher, Ed	148
Harnett	149
Moulton	150
Durffy, J. D.	152
Bremond, C. G.	159
Lander, W. H.	161
Wilson	165
Pratten, A. B. P.	168
Lopez, Mrs.	173
Hay, James	177
Haylock, George	182
Hershmann, J. J.	184
Cate, D. W.	185
Young, Chas	187
Sproul, W. C.	190
King, Mrs. A. J.	192
King, A. J.	192
Passons, Tom	193
Snodgrass, F.	194
Bengle, P.M.	198
Abbott, Hames	201
Hutchinson, Tom	208
Townsley, John	210
Quill, Jim	211
Burke, Frank	212
Hight, John	216
Hunter, Samuel	221
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Court Case 19391 Newell Testimony	271
Gooch, T. L.	188
Los Angeles Express	51
Ramirez, J. R.	79
Newman, G. O.	113
Whitaker, J. C.	276
Orr, J. H.	15
Bixby, Jotham	230
Bixby, George H.	233

Caseboom, C. W. 1
Head, L. W. 49
Gregory, Thomas 96
Rice, H.B. 265

RAINFALL

Egan, Richard 174
Thompson & West 200
Ducommon, E. C. 277

RIGHT OF WAY FOR NEW RIVER

Hay, James 177

WOOD FOUND IN WELLS

Bremond, C. G. 159
Durffy, J. D. 152
Lane, George 210
Hay, James 177
Graves, Eli 70
Cullen, J. T. 72
Proctor, J. B. 93
Gregory, Thos 96
Cook, Dr. A. G. 110
Rice, H. B. 265

WATERS OF LOS ANGELES TO BALLONA

King, Mrs. A. J. 192
Sheilwachter, H. B. 219
Foster, George 226
Warner, J. J. 11
Workman, Wm. H. 16
Kuhrts, George J. 17
Hamilton, A. N. 20
Hewitt, Randall H. 23
Nadeau, George A. 28
Reeve, S. B. 29
Henderson, D. 38
Cate, D. M. 41
Bernal, Joe 45
Slaughter, John L. 45
Los Angeles Express 51
Mesmer, Joseph 60
Craine, Wm. L. 66
Ramirez, J. R. 79
Burns, Frank J. 85
Gregory, Thos 96
Bixby, Jotham 230
Guinn, J. M. 239

Rice, H. B. 265
Morton, J. J. 255
Colton, C. E. 262

LOS ANGELES RIVER TO ALAMEDA ST.

Lopez, Mrs. 173
Guinn, J. M. 239
Workman, Wm. H. 16
Greenawalt, H. 19
Reeve, S. B. 29
Joughin, Andrew 43
Bernal, Joe 45
Head, L. W. 49
Ramirez, J. R. 79
Burton, George W. 269
Waskerbarth, August 270

LOS ANGELES RIVER TO CENTRAL AVE.

Dalton, E. H. 199

LOS ANGELES RIVER TO LOS ANGELES ST.

Lander, W. H. 161
Workman, Wm. H. 16
Mesmer, Jos. 60
Guess, John 249

FLOOD OF 1811

Guinn, J. M. 239

FLOOD OF 1815

Guinn, J. M. 239

FLOOD OF 1822

Guinn, J. M. 239
Warner, J. J. 11

FLOOD OF 1825

King, A. T. 192
Tononi, Mrs. 47
Ramirez, Mrs. 79
Guinn, J. M. 239
Warner, J. J. 11
Guess, John 249
Hunter, Jesse 258

FLOOD OF 1832

Warner, J. J.	11
de Abila, Jose Maria	272
Guinn, J. M.	239

FLOOD OF 1842

Warner, J. J.	11

FLOOD OF 1851-52

Lopez, Mrs.	173
King, A. J.	192
Kuhrts, Jacob	225
Guinn, J. M.	239
Warner, J. J.	11

FLOOD OF 1858-59

Lopez, Mrs.	173
Warner, J. J.	11

FLOOD OF 1859-60

Guinn, J. M.	239

FLOOD OF 1861-62

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	143
Dalton, W. T.	152
Durffy, J. D.	176
Parish, Keno	192
King, A. J.	207
Slack, W. T.	199
Dalton, E. H.	225
Kuhrts, Jacob	272
Sepulveda, Andronico E.	86
Newell, J. G.	246
Thurman, S. D.	249
Guess, John	258
Hunter, Jesse	262
Bolton, C. E.	16
Workman, Wm. H.	45
Slaughter, John L.	239
Guinn, J. M.	60
Mesmer, Jos.	77
Newland, Wm. N.	79
Ramirez, J. R.	85
Burns, Frank J.	86
Newell, J. G.	11
Warner, J. J.	

FLOOD OF 1867-68

Court Case 19391	271
Dalton, W. T.	143
Sanchez, Tom	145
Durffy, J. D.	152
Lander, W. E.	161
Pratton, A. B. P.	168
Egan, Richard	174
King, A. J.	192
Slack, W. T.	207
Hutchinson, Tom	208
Gaines, Mrs. John	217
Foster, George	226
Caseboom, C. W.	1
Guinn, J. M.	239
Workman, Wm. H.	16
Kuhrts, George J.	17
Coffman, F. A.	32
Bouton, Gen. George E.	35
Crain, Wm. L.	66
Newland, Wm. N.	77
Burns, Frank J.	85
Bixby, Jotham	230
Thurman, S. D.	246
Sepulveda, Andronico E.	272
Morton, J. J.	255
Hunter, Jesse	258
Brookshire, J. S.	260
Bixby, George H.	233
Peck, George H.	236

FLOOD OF 1874

Guinn, J. M.	239
Joughin	43

FLOOD OF 1875-76

Wilson, John T.	165
Slack, W. T.	207
Gaines, Mrs. John	217
Workman, Wm. H.	18
Joughin, Andrew	43
Crain, Wm. L.	66
Bise, S. M.	253
Morton, J. J.	255

FLOOD OF 1884

Caseboom, C. W.	1
Rice, H. B.	265
Court Case 19391	271
Cullen, J. T.	72

Watson, T. W.	143
Dalton, W. T.	143
Mason, C. C.	144
Ayers, Ed	146
Todd, John	147
Fisher, Ed	148
Bremond, C. G.	159
Wilson, John T.	165
Hay, James	177
Sproul, W. C.	190
Bryson, J. W.	194
Dalton, E. H.	199
Courtney, J. E.	204
Carse, Levi	205
Hutchinson, Tom	208
Townsley, John	210
Wilson, Henry	218
Engâlhardt, George	220
Hunter, Sam	221
Hughes, W. H.	223
Drinkwater, T. P.	224
Denman, J. G.	225
Thornburg, C. H.	36
Graves, Eli	270
Temple, Walter P.	268
Teel, J. A.	57
Clark, "Uncle Billy"	58
Mesmer, Jos.	60
Crain, Wm. L.	66
Bixby, George H.	233
Guinn, J. M.	239
Burton, Geo. W.	269
Sepulveda, Andronico E.	272
Cate, D. M.	41
Tierce, T. R.	249
Bise, S. M.	253
Hunter, Jesse	258
Brookshire, J. S.	260
Guinn, J. M.	10
Denio, E. C.	15
Workman, Wm. H.	16
Kuhrts, George J.	17
Hamilton, A. N.	20
Place, George A.	22
Hewitt, Randall, H.	23
Wright, Geo. A.	27
Nadeau, Geo. A.	28
Reeve, S. B.	29
Bouton, Gen. Geo. B.	35
Joughin, Andrew	43
Slaughter, John L.	45
Head, L. W.	49
Los Angeles Express	51
Thomps on, Mrs. O. D.	55

Saunders, Lafayette	55
Thurman, S. D.	246

FLOOD OF 1886

Bryson, J. W.	194
Pillsbury, George E.	91
Guinn, J. M.	239

FLOOD OF 1889-90

Carson Bros.	9
Guinn, J. M.	239
Cummin, John	13
The Evening Express	14
Orr, J. H.	15
Kuhrts, George J.	17
Hewitt, Randall H.	23
Pillsbury, George E.	91
Gregory, Thos.	96
McGaugh, M. J.	221
Cruz, Jesus	7
Eilers, C. H.	8
Kurtz, Dr. Carl	19
Reeve, S. B.	29
Cate, D. M.	41
Head, L. W.	49
Crain, Wm. L.	66
Thornburg, C. H.	36
Henderson, D.	38
Teel, J. A.	57
Ray, John	64
Burns, Frank J.	85
Sepulveda, A. E.	19
Caseboon, C. W.	1
Rice, H. B.	265
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Rice, H. B.	265
Watson, T. W.	143
Wilson, John T.	165
Snodgrass, F.	194
Montgomery, J. A.	203
Gaines, Mrs. J. D.	217

FLOOD OF 1891-92

May, James	177
Sproul, W. C.	190
Hutchinson, Tom	208
Elftman, O. E.	6
Hewitt, Randall H.	23
Coffman, F. A.	32
Cate, D. M.	41

Stevenson, H. J. 47
Landt, S. D. 48
Bixby, George H. 233
Tierce, T. R. 249

FLOOD OF 1914

Bengle, P. M. 198
Abbott, Hames 201
Montgomery, J. A. 203
Gillespie, J. W. 206
Wilbur, J. S. 207
Burke, Frank J. 212
McGaugh, P. G. 215
Hight, John 216
Elftman, O. E. 6
Place, George E. 22
Bernal, Joe 45
Bixby, George H. 233
Smith, Joseph 246

HIGH WATER BREAKS INTO NIGGER SLOUGH

Cullen, J. T. 72
Holcomb, Dr. A. L. 217
Rogers, Henry 218
Watson, Joe 5
Cruz, Jesus 7
Eilers, C. H. 8
McKinsey, George H. 8
Traub, Mr. 8
Elftman, O. E. 6
Carson Bros. 9
Cummin, John 13
Reeve, S. B. 29
Cook, Dr. A. J. 117
Peck, George H. 236
Guinn, J. M. 239
Guess, John 249
Morton, J. J. 255
Colton, C. E. 262

CHARACTER OF SOIL AND DEPTH

Bremond, C. G. 159
Young, Chas. 187
Passons, Tom 193
Elftman, O. E. 6
Smith, W. 13
Thornburg, C. H. 36
Harper, Wm. 64
Mulholland, Wm. 89

Proctor, J. B. 58
Gregory, Thos. 96
Bixby, George H. 233
Rice, H. B. 265
Morton, J. J. 255
Hunter, Jesse 258

GOVERNMENT DITCH

Todd, John 147
Harper, Wm. 64
Crain, Wm. L. 66
Morton, J. J. 255
Hunter, Jesse 258

PERCENTAGE OF SILT CARRIED BY FLOODS

Newman, G. O. 113
Bixby, Geo. H. 233
Wilson, John T. 165

EARLY NAME OF LOS ANGELES RIVER

Father Crispi's Diary, 1759 11

EARLY NAME OF THE SAN GABRIEL RIVER

Father Crispi's Diary 11

ORIGIN OF THE NAME OF RIO HONDO

Bixby, Geo. H. 233

ORIGIN OF NAME OF LEXINGTON WASH

Peck, Geo. H. 236
Temple, W. P. 268
Guess, John 249

ORIGIN OF NAME OF LICK SKILLET

Peck, Geo. H. 236
Colton, C. E. 262

ORIGIN OF NAME GALLATIN

Pratten, A. B. P. 168
Cate, D. W. 185

FILLING OF SLOUGH ABOUT RATTLESNAKE ISLAND

Bixby, Jotham	230
Morton, J. J.	255

SWAMP IN SAN FERNANDO VALLEY

Hunter, Sam.	221
Colton, C. E.	262

NEW RIVER TO COYOTE CREEK

Hay, James	177
Johnson, D. D.	180
Young, Chas.	187
Carse, Levi	205
McGaugh, M. J.	221
Elliott, J. S.	223

SWAMP IN SAN FERNANDO VALLEY

Ramirez, J. R.	79

MOVEMENT OF SAND IN THE BED OF STREAM DURING FLOODS

Newman, G. C.	113
Mulholland, Wm.	89

EARTHQUAKE OF 1857

Thurman, S. D.	246
Guess, John	249

DEPOSITS OF SILT

Watson, W. T.	143
Todd, John	147
Woodberry, G. B.	148
Hickson, J. L.	--
Bremond, C. G.	159
Wilson, John T.	165
Pratten, A. B. P.	168
Hay, James	177
Haylock, George	182
Young, Chas.	187
Hershman, J. J.	184

King, A. J.	192
Snodgrass, F.	194
Bengle, P. M.	198
Courtney, J. E.	204
Carse, Levi	205
Slack, W. T.	207
Lane, George	210
Townsley, John	210
Burke, Frank	212
Brown, George	213
Funk, L. O.	216
Foster, George	226
Smith, Joseph	246
Thurman, S. D.	246
Guess, John	249
Bise, S. M.	253
Morton, J. J.	255
Caseboom, C. W.	1
Elftman, O. E.	6
Smith, W.	13
Kuhrts, Geo.	17
Germain, A.	21
Thornburg, C. H.	36
Henderson, D.	38
Head, L. W.	49
Saunders, Lafayette	55
Harper, Wm.	64
Graves, Eli	70
Cullen, J. T.	72
Bixby, Fred H.	73
Mulholland, Wm.	89
Proctor, J. B.	93
Gregory, Thos.	96
Newman, G. O.	113

I-R 1.
Mr. C. W. Caseboom,
Los Cerritos, Long Beach.

Mr. Caseboom was seen by F. Z. Lee this afternoon, December 2, 1914 at his home. He says:

I came here in 1874 and worked for the Bixby's for a while, then began farming for myself. I had a place west of Willowville Station on the P. E. Ry., and was doing very well. The first flood that visited us and caused some change was that of 1881. We did not think much of that however.

But in 1884 we had a big one. I woke up in the night and thought something unusual was going on and upon looking out found that we were surrounded by water. I woke up my folks, and also the Martin boys who were with me at that time. I got them out and had them hitch up the team, for at that time I was crippled and was using crutches to get about.

My wife and baby and one of the boys and myself piled into the wagon and drove down toward Long Beach. The other boy rode a saddle horse, which we had, and went on down to my father-in-law's to wake him up so that he could get out. When we reached about where the gas works are the water was just getting down there and we barely got out ahead of it. But my father-in-law did not have time to get out before the water caught him. He had to swim his horses and wagon out, the water came down so fast.

We had a camp up on the Mesa where the Polytechnic High School now is, so that we were at home again.

But it rained a great deal that winter, and we did not get back to our place for a month or six weeks, there was so much water in the valley.

There were no washes in those days, that is, that you could count as anything. It was nice and level clear across the valley. There were none of those washes over towards Dominguez or Watson. Those washes have been cut in there in comparatively recent years.

Kincaid had a beautiful place fixed up and to see it you would think he was going to stay there for all time. It was nicely laid out and he had a good house and barn, well and so on, but this flood swept him clean. It carried away his house, barn and fences. It even lifted out his well casing which was twenty-eight feet deep and carried it away. All that was left of his house was the floot and it was sunk eighteen feet below the surface. The water got started to cutting underneath it and simply whipped the silt from under it and let it down. It just about ruined Kincaid.

However, he went to work and moved back onto higher ground and built again.

This was all a part of the Cerritos Colony and land began to sell and the boom came on.

Jotham Bixby would let people go in on his land and cut the wood off it, put it in cultivation and give them the crop for the first year. It paid him for he could sell his land that much better. It was all during the development period and Mr. Bixby would allow the people lots of privileges.

The people put in an irrigation ditch and they put it wherever it seemed best, that is on the best ground where it would carry water the furtherest. So the ditch went every which way across people's property.

Finally Kincaid and Wardlow wanted the ditch straightened out and put on the property lines. There was some objection, but that was overcome and finally it was taken to Mr. Bixby and put up to him. He thought it was a good idea and to help matters along he told them he would give them one hundred and eighty dollars towards fixing it all up. They did. They dug a fine looking ditch twelve feet wide across the bottom and planted trees along the banks and everything went along very well for two or three years. Then the flood of 1889 came along.

The San Gabriel River was not where it is now. It was never up against the bank as it is at the P. E. Bridge. It was away over in the valley, and ran down a good long ways and then turned and ran toward Long Beach Harbor. But it did not empty into the bay where it does now either. It emptied into the bay west of what they call_____. That was the way it was before this ditch was dug.

This flood of 1889 came down and began to cut around the head gates of the canal and finally got started down the ditch and the first thing they knew all the river was coming down that way. Oh! it ruined lots of people over there. They then wishes they had not straightened that ditch out. But the damage was done and the river changed.

Some of them moved out and away. Back in 1884 Fayette Saunders was flooded out so often until he got afraid of the water. He got a chance to buy 40 acres up on the hill when that tract was opened up and he bought up there. He would never have made anything if the floodshad not driven him out.

In the later floods the land has been cleared up so much and no protection given from the river until now the land is badly cut up. It is in those last floods that the Dominguez and Vignes' land has been cut up so badly.

There was never any deep washes hear Watson. We used to drive across the San Gabriel River just west of Long Beach, and did not need a bridge, did not even think of such a thing. But now there are places you could throw a house into and not know it was there.

The San Gabriel River has always flowed into Long Beach Harbor except when it split and part of the water joined the Los Angeles River below Dominguez and flowed into Wilmington or San Pedro harbor.

In some of the floods this was done and there was so much water in the valley that it broke into Nigger Slough. We have always thought that the land around Nigger Slough was of little value because it was subject to overflow and was marshy. In the big floods there was been a solid sheet of water across the valley between Dominguez and Bixby's.

When the Salt Lake R. R. put the fill across the mouth of the San Gabriel River at Long Beach it shoved all the water westward and this flooded the Salt Works. Those people of course, were not at all pleased with this and in their turn put up a levee and turned the water further westward into Wilmington.

The Channel called New River broke away from the San Gabriel in 1867-68 and emptied into the Los Alamitos Bay. The water spread out over the land over between Clearwator and Anaheim and as far south as Westminister. In 1876 there was a big flood in New River that did the same thing almost. There was water from Anaheim to Westminister and along the channel there was a body of water three feet deep and a mile and a half wide tearing along at a good velocity.

In every big flood year it is the same. The lowlands are flooded and deposits of silt placed on all of it.

When the San Antonio protection district was formed some of the people thought they had secured safety from the floods, but they soon found out that it was not so. Their channel is too narrow and no way was provided to carry off the silt. The result was that the channel filled up and now the bed of the stream is higher than the land on each side. It will continue to fill up because there is not enough current to carry away the silt.

All of this Alamitos land was swampy and had lots of water in it. The most remarkable thing was that people, in the early days did not know or realize that there was so much water and that it could have been so easily had. The water came to the surface in a great many places and could have been had by digging only a few feet down.

During the dry years of 1862-63-64, thousands and thousands of cattle and horses starved to death for food and water. Around those springs the cattle crowded around to get water. If a weak one got down it was tramped to death by the others in their effort to get at the water.

In digging post holes and wells in many of those places it was sometimes almost impossible to dig down on account of the number of bones found. In digging wells I have found bones six or eight feet down in the mud, that have been worked in by the countless number of animals that have tramped over them. The earth was soft and wet and the bones would easily work down by the constant trample of feet, yielding to the pressure above.

Those springs were only a small part of the outlet to the great amount of water in the ground. A sample of water taken at Redondo Beach would show at least 25% more salt than a sample taken outside of Alamitos Bay. Captain Polhoumas of San Pedro has told me that a ship

could take on its supply of fresh water out in the ocean off Alamitos Bay. There was an immense volume of fresh water that emptied into the ocean at that section opposite the Alamitos region. People bathing in the sea at one of these places upon going to the other would at once notice the great difference.

Mr. Jotham Bixby was the first man to put down a well in this country. When General Bouton put down his deep wells the pressure was enough to raise the water fifty feet into the air. On one occasion a well driller had his tools shot out of the well with considerable force.

In casing in some of those wells was eighteen inches in diameter and it was easy for a man to drop into one of them but he need have no fear of sinking as the pressure of the water would never have permitted it. I knew it to be tried and the water would easily throw the man out.

The shallow wells, that is down to three hundred feet was all white water, but when a depth of six hundred feet was reached yellow water was found and the deeper the wells the stronger the yellow water. The cause of this yellow water was the sulphur it carried. The water was good but tasted some of sulphur.

The source of this supply of water is from the mountains. No one knows how far it comes but there is no doubt where it comes from. The floods do not materially effect the level of the water in the wells as it does not, and could not soak in fast enough. The large number of wells that have been put down have lowered the supply so that now there is not the pressure to make artesian flows.

When we think of the immense size of the floods that have come down from the San Gabriel and Los Angeles Rivers it is hard to say how big a channel should be that would carry all of that water. A stream of water a mile and a half wide and three or four feet deep running as fast as a horse could trot along would be hard to confine in a narrow channel. If the river is allowed to wind about without much bank protection, it will take at least a half of right of way to carry the river. But if they confined the river, putting it between banks that will control the floods, it must be at least a quarter of a mile wide. There is always going to be more or less trouble keeping the channel cleaned out. The current is not swift enough to carry the silt into the sea, and of course, there would be no other place for it to go but stop in the channel. That is very evident right now in the channel the people made in the San Antonio district. I told Courtney and Elam this when they were putting up the work.

It also shows that the channel is not beg enough to carry the floods.

The channel must be kept clean and I believe that a dredge or steam shovel kept there to throw out the material that will be deposited there each year by the floods.

Everybody wants protection and I think that the ones most benefitted should shoulder most of the costs, but every one will benefit by the rivers being controlled and the lands being protected from the destructiveness of the floods.

1
Edward E. Wilson:

His place just west of S. P. R. R. track, and just south of Dominguez road west, comprises 152 acres, estimates that 120 acres were covered by flood waters. Did not damage. On the lower side of his place the flood deposited about one foot of silt. Compton Creek passes through his place just below his house. There was water all around his buildings and as far north as the road. The water flowed westward along the road and then down Compton Creek. He says if he did not keep the channel of Compton Creek clear and open it would flood him. He is highly in favour of protection, although he was not damaged. Lived on his place eight years.

2
"Joe" Watson:

His place near "Nigger Slough" had about 2500 acres under water in 1814. Says it was the largest flood he has ever known. He was born and raised here. Thinks the people are to blame that they individually built dams and levees across the water when they wanted water, which they were entitled to, and when the floods came the waters cut out at the ends of the dams and wingwalls and spread over the country. Some of these lands are ruined, as around Watson's Station. Water came up in his corrals, and flooded his beets, alfalfa and barley lands, which were considered safe. He thinks something must be done, it will ruin the country to allow it to go on. Refers to his brother, J. J. Watson, who has maps of this section.

2
Stewart Ranch, on Redondo Road (A Dairy)

Had one foot of water in the milk house, and two feet deep up on the house; six inches in the barn.

2
Mrs. Frederick Maskey had water all over her place, and it reached up to the first step on her porch. The water washed large holes in her yard. She had four floods instead of one; the road was impassable for a month.

2
The Los Angeles Star of Jan. 25, 1862, speaking of the San Gabriel river says it was out of its banks for the reason that the stream became clogged and choked on the plains and then spread over the country. It forged a new channel from the east side of El Monte to the west side of the same place. Much damage was done to ranches, houses, etc. One ranch lost 30 acres and 5000 grape vines. There are many other such instances.

3
Mr. O. E. Elftman, Elftman Station,
on S. P. R. R. to San Pedro.

Mr. Elftman has definite and well defined ideas of the floods, the action and their schemes for protection against them. He has lived on or near his place for thirty years, Put the first well down for power pumps. The flood of 1914 carried more water than that of 1889, at least there was a foot more water on his place than the earlier date. The railroad was then built on the surface of the ground, practically between the points of the hills at Dominguez and Watson. In 1889 the flood practically washed out all the tracks, and the water flowed to Nigger Slough. He claims he can trace the old San Gabriel River channel through the valley by following the old flood ridges where the river at one time flowed, the bed of the river being higher than the land on each side. This land and gravel bed is five to six feet deep, and is clearly indicated by the crops grown--that is by the quantity. This old riverbed can be traced from San Pedro to near Compton. Mr. E. contends that to turn the water from the valley will have no effect on the level of the water table, as this water supply is from the mountains and extends down about 160 feet. The formation to this depth is first the present silt and sand, then a layer of black alkali six to eight inches deep, then again sand silt gradually getting coarser at about 100 feet, when a coarse sand and gravel is reached, which is the main water-bearing strata, which is all gravel and boulders to a foot in diameter.

The Los Angeles River has had a definite channel, and has never carried any water except flood waters. The flooding of the valley began when the Dominguez people began putting dykes across the valley to turn the water to the river channel. These were built of the soil and planted to salt grass and willows. Instead of holding the water in the channels, the water came in from the sides and could not gain the old channel, hence spread over the valley. This was the beginning of the river leaving its channel.

Forty years ago wood was very scarce here, and the people had to go to the mountains for it. They began planting willows and at one time the entire valley was covered with willows, except small tracts, such as 20 or 40 acres in spots. The willows grew upon the best ground, and later on the willow ground was the best agricultural ground, as can be shown around Compton. In those days the wash did not amount to anything. The flood spread out over the valley and the flow was slow and could not wash, but as the land was cleared and the channel neglected they began to have those damaging floods. Then the Dominguez people began to try to control the river. The lands acquired by the Bixbys clearly attest this view, for looking over this ground it will be seen that they have allowed their side of the river to grow up with willows, and at the same time forcing the river further westward. Now a large amount of land is covered with sand from one to four feet deep and of little value. Mr. Elftman has definite ideas of the surface water, as he has put down two wells and lined them with cement; holes in the walls and plugging them, in this way can locate the surface water.

While he said he has not been damaged as much as some, still he contends that about forty acres of his land has been injured by this deposit of sand. The flow of the flood of 1889 was more like

back water than a stream, while that of 1914 was very swift and did a great deal of damage by washing.

His ideas are that every one should be willing to go into this thing to make it big enough to adequately do the duty required of it. He thinks the right of way for the river should not be less than 1000 feet wide, and then so constructed as to get Nature to assist in the work. A channel of say 500 feet wide then on each side make the banks with easy slopes and plant it all with willows near the water and the low places, and on the top and higher places plant blue gum trees, then salt grass over all that. These banks should be 250 feet wide. In this way they would not wash out; then the channel of the river could be cultivated and put to a crop of potatoes or vegetables, something that would grow a light stalk. There is ample time between the flood season to do this, and be profitable a s well. This would keep the bed of the river loosened up and would always scour easier. This channel should be from the mountains to the sea.

Mr. Elftman is willing and glad to be of any assistance in any way he can, but says, Make the work big.

At Station "Cota" on the Pacific Electric Railway to Long Beach, the floods are much higher on the east side of the tract than on the west side. There was 3 to 4 sand deposited. The buildings just east of the track at Cota show at least five feet of water. Culvert just north of "Cota" was full of water. The fill of the P.E. R.R. confined the waters, and had the "dump" not been there the water would have spread out and done much less damage.

6

J. P. Hoeptner, just west of Dominguez pumping plant, on the main road has lived in the valley 23 years, says last year the water backed up to his place from Watson. Says the tendency of the tracks is to throw the water to the east, but would break through the banks and flood the western part of the valley.

His wells are for pumping for irrigation are 460 feet deep, and for household purposes 200 feet deep; water rises to 20 feet of the surface.

6

Jesus Cruz lives on the place just west of the track of the S. P. Ry. at Elftman right up next to the hill. Came to this place when he was nine years of age (probably 50 years now). He was afraid of heavy taxes for flood protection, but claims to be above the meneserial district and would not be benefitted by the improvement. He claims it is the people's fault that they did not keep the river channel open. They let it clog up with brush, willow and other obstructions and when the floods came there was no place for the water to flow-- hence overflowed its channel.

He thinks that to cut off the water from the valley would lower the water table and make pumping much more expensive.

Last year water backed in from Watson's and filled Nigger Slough.

After the flood of 1889 a dike was built along the county road from Somback's ranch to the point of the hill to hold the water out of Nigger Slough, but did not hold. (I have not been able to confirm this statement other than by Bob Watson who says they put in a board bulkhead and attempted to hold the water back, but was washed out as thought it had not been there. This cost the Watson's $1200.)

The 1889 flood broke through the railroad near Elftman's Station and washed out about 300 feet of track--flowing into Nigger Slough.

In the early days the valley was covered with willows, larch, sycamores, etc.. Later only willows in patches, until they were finally cleaned out almost entirely by the settlers.

7

Mr. Traub has lived near Watson's Crossing nearly all his life and has seen the waters back into Nigger Slough and cover all of that country up to the county road. Says slough goes down now much faster than in former years. Thinks this is due to wells. These floods come regular and will continue to come.

7

Mr. Passit of O. E. Thomas' Dairy, Compton, on road east from Dominguez Station, declares that he would not vote a cent for improvements to control the river, due to the manner in which (section incomplete at this point.)

7

C. H. Eilers, near Elftman. Has lived in this locality 25 years and knows of all high water marks. Saw the S. P. R. R. from the hill near Elftman and Watson was completely washed out in 1889. Refers to Robert Shered as his first contract making a fill in the S. P. near Elftman. Says all the washes and holes west of Jesus Cruz' places was caused then; that water backed almost to Gardena and within two miles of Redondo. He was not damaged very much but is highly in favor of making the improvements. Says make them, the cost is a minor detail, too valuable to lose property by being washed away. Will be glad to go with us and show all water marks. Tells of dying carp in 1894, when the Supervisors had to burn them on account of the stench. Says the whole valley was practically covered with willows. He has seen the big work done in N.W. Germany and knows that protection can be had and advocates big and thorough works.

Geo. H. McKinsey has lived on what is known as the Old Carson [illegible] Ranch, now owned by Wm. M. Himphries, former Supervisor. Says:-- Before the rains last winter Nigger Slough was dry. He had been farming, raising beets on the land. About ten acres of Mr. Humphries'

place is under water and about 100 acres leased from Mr. Carson to raise beets is also under water. With the water drained off, the land would be a gardon spot but now is a frog pond. The East branch of the Slough backs up quite a ways and is now holding water. The road is impassable to anything but a light rig or a horse--water about two feet deep at the deepest point.

Water has backed up in the Slough and covered the County road in the three branches, on the Los Angeles-San Pedro Boulevard. See Map.

8

The Carson Brothers at Dominguez have lived there all their lives. Ed. Carson states that the river at one time ran along the foot of the hills at the Dominguez home place, 1824. They say that from Dominguez hill to Los Cerritos is considered the river. In 1858, perhaps it was the '60-'61 flood, a boat came up from San Pedro and took the Carson family, who lived over in the valley east of the Dominguez home, off of their marooned and dangerous position and carried them over to the Dominguez place.

The floods in those days were not so damaging and did not wash as they do in these later days, for there were no railroad embankments to hold the water or to concentrate it, but the water was free to spread out over the valley and did little damage. And too, the valley was covered with a growth of willow, larch, and sycamore trees, together with grasses and other undergrowth which prevented a rapid movement of the waters. The railroad fill from what is now Elftman and Watson, was washed out and the floods poured into Nigger Slough. This was in 1889. About 1894 the Slough began drying up rapidly, and fish began to die by the tons. The stench became so bad it became necessary to burn and burn the dead fish. This greatly fertilized the land. By 1896 the Slough was dry and remained so up to the winter of 1913-14 when it again filled. This land was under cultivation at this latter date, and was considered good ground. Alfalfa and beets were the principal crops.

The Carson brothers say that the river should be controlled and have no objections to the flood water being turned into Los Alamitos Bay. However, they would want their water rights and would want the normal flow of the river to continue into the valley.

There is a book called, "Los Angeles and Vicinity History and Biography", by J. M. Guinn, which relates that in 1814 the Los Angeles River turned westward from its channel, and run down about where Alameda street now is, broke westward near 4th and 5th streets and ran through Ballona emptying into Santa Monica Bay.

This is evident from the foundations of the New Hamberger building, which show river gravel and sand.

9

Porciuncula

This name was given the Los Angeles River in 1769 by Father Crispi, August 2nd, from a small hamlet in Italy near which was the little Church of Our Lady of the Angels in which St. Francis of Assissi was praying when the jubilee was granted.

San Pedro harbor, discovered and named by Juan Rodriguez Cabrillo, Bahia de Los Fumas or Fuegas, October 8, 1542.

July 16, 1769. The first Mission was established at San Diego by Junipero Serra and Gov. Portoli. Note: on the 14th day of July, 1769, Gov. Gaspar de Portoli, started a land force of 75 officers and soldiers and two friars, for Monterey Bay from San Diego and on August 2nd, 1769 discovered a river which they named "Porciuncula", now the Los Angeles River and they camped that night within the present city limits of Los Angeles (Guinn's History and Biography, Los Angeles, Reference R-979.41, L. 88-2, Public Library) Their camp was called Muestra Senora de Los Angeles. The San Gabriel River was known as San Miguel and in 1769 was also called Rio de Las Temblares.

Where the San Gabriel Mission was located the Padres planted and cultivated the low bottom lands, but the crops of the first year were overflowed and destroyed in 1771.

In 1776 the Mission was moved from its first site to its present location.

There was a lagoon near the Mission, on which a mill was afterward built, which was a complete thicket of sycamores, cottonwood, larch, ash and willow, besides brambles, nettles, palona cristi, wild rose and wild vines and on the banks of this lagoon stood the Indian rown of Sibagua, one of the largest villages in the valley.

A memoir from Father Crispi, August 2, 1769, as they journeyed from San Gabriel to Monterey, says "After traveling about three (from San Gabriel) we came to a rather wide canada have a great many cottonwood and Alder trees. Through it ran a beautiful river towards the north, northeast and curving around a point of a cliff it takes a direction to the south. Towards the north, northeast we saw another river bed which must have been a great overflow, but we found it dry. This arm unites with the river and its great floods during the rainy season are clearly demonstrated by the many uprooted trees scattered along the banks. This dry river is Arroyo Seco. We stopped not very far from the river to which we gave the name Porciuncula.

The site selected for the pueblo of Los Angeles from where Alameda Street now is to the eastern bank of the river was covered with a dense growth of willows, cottonwood and elders, while here and there, rising about the swampy copse, toward a giant Aliso (sycamore).

Records of floods in Mr. J. M. Guinn's Los Angeles Vicinity Library reference R-979.41, L. 88-2

First flood of record is from Father Crispi's diary, which relates that the first crops planted at San Gabriel were overflowed and washed away in 1771-72. In 1810-11 there was a great flood, and all the rivers of Southern California were overflowed. In 1815 there was a flood which materially changed the course of the Los Angeles River within the Pueblo limits. The river abandoned its former channel and flowed west of the Suertes or planting fields of the first settlers. Its new channel followed very nearly the present line of Alameda Street. The old fields which were situated where Chinatown now is were washed away or covered with sand, and the new fields were located about where San Pedro Street now is.

In 1825 the river again lefts its banks and moved eastward to its present channel. This flood affected a great physical change in the country west of the city.

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12 Col. J. J. Warner says:

In 1825 the rivers of this country were so swollen that their beds, their banks and the adjoining lands were greatly changed. At the date of the settlement of Los Angeles a large portion of the country from the central part of the pueblo to the tide water of the sea through and over which the Los Angeles River now finds its way to the ocean was largely covered with a forest interspersed with tracts of marsh. From that time until 1825 it was seldom, if in any year, that the river discharged even during the rainy season its waters into the sea. Instead of having a river way to the sea, the waters spread over the country filling the depressions in the surface and forming lakes, ponds and marshes. The river water, if any, drained off from the land in so many places, in such small volumes, that no channel existed until the flood of 1825, which by cutting a river way to tide water, drained the marsh land and caused the forests to disappear."

Again he says:--"The flood of 1832 so changed the drainage in the neighborhood of Compton and the northwestern portion of the San Pedro Ranch, that a number of lakes and ponds, covering a large area of the latter ranch lying north and northwesterly from Wilmington, which to that date had been permanent, became dry in a few years thereafter. The drainage of those lakes completed the destruction of the forests." Col. Warner says: Covered a large portion of the country south and west of the city. These forests were in all probability thickets or copse of willow, larch and cottonwood similar to those found in the low ground near the mouth of the Santa Ana River and in the swampy lands of the San Gabriel River thirty years ago.

In 1842 another flood occured similar to that of 1832.

The winter of 1859-60 was a season of heavy storm in the mountains. On December 4, 1859 a terrific southeastern set in and in forty-eight hours twelve inches of rain fell. The waters of the San Gabriel River rose to an unprecedented height, and in the canyons swepts away the miners' sluices and mining machinery. The rivers overflowed the lowlands and large tracts of the bottom lands were covered with sand and sediment.

Again: The flood of 1861-62 was the greatest of all. Nearly 50 inches of rain fell. The rivers spread over the lowlands and the stock took to the hills for safety. In Anaheim there was four feet of water in the streets, and spread in an unbroken sheet to the Coyote hills three miles beyond. Arroyo Seco brought down immense amounts of drift which furnished fuel to the people for years. The rain began on December 24, 1861 and continued for thirty days with but two slight interruptions.

The San Gabriel became dammed out on the level grounds and broke from its easterly course from El Monte and started a new channel west of El Monte.

A great deal of stock, houses, vines, trees, etc., and mention was made of one entire place of thirty acres which were washed away.

The flood of 186768 changed the country a great deal. The San Gabriel River created what is known as "New River". Several thousands of acres of land were washed away.

In 1884 considerable damage was done to the lower portion of the city. Many orchards and vineyards were lost.

In 1886 it was similar to 1884. The water was up in Alameda St. and did great damage.

During the flood of 1889-90 the Los Angeles River cut a new channel for itself across the Laguna Rancho emptying its waters into the San Gabriel River several miles above its former outlet.

Los Angeles founded September 4, 1781.

The Los Angeles Tribune of December 25, 1889 gives an account of part of the storm telling of many bridges washed out in the city. Water came down Temple Street carrying boulders weighing 25 pounds. Alameda St. was, "as usual", a river--in some places deep enough to swim a horse.

Buena Vista St. R. R. bridge (S.P) went out, also Santa Fe.

One (1) foot of water on Main St. on Beaudry Ave. bet. 12th & Pico four feet of water. The city pound, 2nd & San Pedro, had two feet of water.

Damage along river estimated at $250,000.

Los Angeles Tribune, Dec. 26th 1889. See sketches for damages to bridges. Gives many interesting accounts of damages. See also issue for 27th inst.

See Dec. 28th--Santa Ana shut off for four days from all outside communication. Many square miles of land were under water.

14
Mr. W. Smith: Mr. W. Smith has been on King's Ranch, of the Bixby estate, for four years. He says the water covered all of their land from the river to the hill to the east and south of them. It did but little damage as it did not wash, but rather filled in the holes and low places, also deposited two or three feet of silt over alkali land on which they could not formerly raise anything. They estimate that it did the land $40,000 good. This is reasonable, in that they have some very fine agricultural land and are now raising big crops where before they could grow practically nothing.

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15 Mr. John Cumming on the Dominguez place north of the Thomas Dairy has lived here for twenty-five years. Was on the Dominguez place at the time of the '89 flood. He says the flood washed out the S. P. track and that the waters flowed into Nigger Slough. The waters also formed New River Channel and he understands that the river flowed into Alamitos Bay. Where his place now is there was a heavy wash in those days and he says it will come again if something is not done.

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15 John Mullhern on east of the L. B. Boulevard, has had considerable loss. The flood has cut his land and washed away some 23 acres, washed away a barn, hay, animals, tools and harness. Thinks the country should do something and that soon. He was here during the flood of 1889 and says that the Los Angeles River cut through into the Alamitos Bay side. Last winter the land between the river and the boulevard was a solid sheet of water. He says that the flood has lowered the price of land more than $300 per acre, as stated by Mr. Rice. He thinks the floods should be turned into Alamitos Bay.

15
Mr. J. Stimson on Artesia Road, just east of River, has lived here eighteen years. Has not been bothered or damaged by floods to amount to anything up to five or six years ago. Since then he has been flooded some and last winter the storm did him considerable damage in one way, in that he lost his crops, and washed some. However, the flood also did him good in that it filled some of the low places as much as three feet. This made soil rich and will be good for ten years or more. Mr. Stimson is eager to have something done and that soon. He realizes that no one can tell when the next flood will come, nor where the damage would fall, in other words where a new channel would be cut.

In the beginning Los Angeles was symmetrical. The Pueblo contained four square leagues; in the center was the plaza 75 x 100 yaras. It was the geographical center of the settlement. One league toward each wind you reached the pueblo's boundary lines.

On March 1846 a commision located the bounds of the pueblo Two leagues were measured "in the direction of the four winds from the plaza church", and stakes set.

An order to found a pueblo to be called the Pueblo de Nuestra Senora La Reina de Los Angeles--4th September, 1781.

On page 6 of J. J. Warner's History of Los Angeles County, Chapter 1, on physical features in the next to last paragraph, 1st column commenting on the Los Angeles River, says: "Its ancient course to the sea was via the Cienega and La Ballona.

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16 The Evening Express, December 26, 1889, says:

Much damage has been done in and about the city. Streets cut up, conduits filled with sand, bridges carried away, railroad tracks covered with dirt, and much other damage done.

The approaches to the Kuhrts street bridge were washed away. About half the Santa Fe bridge over the Los Angeles River swept away, and dashed against the Buena Vista street bridge, weakening the piers and badly damaging it. The S. P. pile bridge below Kuhrts street bridge almost entirely carried away. The 7th & 9th street bridges so badly damaged as to render them unserviceable.

The storm was general all over the Southern section of the State. No trains on the Santa Fe or S. P. have either arrived or departed except one to Santa Monica.

Levees in numerous places have been washed away.

The country between this city and the sea is in many places covered by water and many ranchers will lose heavily. The extensive vegetable gardeners south of the city will lose heavily.

At Compton the water is very high. The citizens resorted to boats and made their way about town in that way. The country in that vicinity is flooded and it will be weeks before the surface will be dry. On Dec. 24th the S. P. train failed to return. The train reached Compton by noon and returned.

Hon. H. T. Gage says that the new San Gabriel, the old San Gabriel and the Los Angeles Rivers have formed one body near Downey and are sweeping toward the ocean carrying everything with them. On the Laguna Ranch a lake five miles in width has formed and the water nearly to the top of the hay stacks. The Los Angeles River, two miles below the city, has swerved from its channel and is running down the Downey road.

Dec. 27, 1889: S. P. line to San Pedro still broken. The passengers going over the gap by wagons.

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17 Los Angeles Evening Express, Dec. 27, 1889 in an editorial says:

The Los Angeles River is reported to have lefts its old bed below the city and to have taken, at least for a time, the old Downey road, for a channel. This thing of switching off into a new channel is not unusual for rivers in this section. In one of the precious wet years, 1858, we believe, the San Gabriel River, all of which previously flowed down to the ocean this side of Downey and across the western side of Cerritos Ranch, brokeout of its channel and cut across the country some miles further to the east and ever since that time there has been two San Gabriel rivers from the Rivera southward. There is a well-founded belief that the Los Angeles River at one time flowed into the sea by way of Ballona. The disposition in the rivers to change their courses is, of course, due to the large amount of debris washed down into their beds, thus filling them up, and causing the water at times of flood to turn aside into new channels. Old residents say the bed of the river in this city is many feet higher than it was fifteen or twenty years ago.

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18 Mr. J. J. Watson thinks that to turn the flood waters to Alamitos Bay would make no difference with the pumping water of the valley, and he is in favor of this proposition, He is of the (MS incomplete here)

18 Mr. J. H. Orr, Compton, R. F. D. 1, 101 Home at Compton.

Mr. Orr has lived in this neighborhood for twenty-six years. In 1889 he says the whole country was flooded and to give an idea of how much water there was, he with some others rowed in a boat from Downey almost to Compton, that is to the S. P. R. R. track, tied their boat and walked across to Compton, bought their provisions and returned in the same way. The water was all over the country for six weeks and nothing could be done.

Last winter the flood did great damage to Mr. Orr, his place having been badly cut up by the waters. There were hemmed in on all sides from the river to the boulevard.

For a time it looked as though they would lose their barn. Mr. Orr went up to El Monte to see the situation up there and believes from what he saw that the river will fall over toward the west side of the valley in the next big flood. He says that the east s ide of the valley is higher than the west, due to the floods each year filling up that side of the valley. Says it is a very big proposition and that people do not realize the amount of water that flows during those big floods.

19
Mr. E. C. Denio,
307 National Bank Bldg.
Long Beach, Cal

Mr. Denio lived in San Fernando Valley back in 1884 andsaw many floods since. In 1887 400 acres of their ranch was swept

absolutely clear, vegetation, soil and all. The Pacoima once ran where the town of Pacoima now is, known in those days as McClay's switch. The Big and Little Tujunga would change about a great deal and have done much damage in San Fernando Valley. Judge Widney laid out the town of Pacoima.

When the Salt Lake first made their surveys for the railroad into Long Beach, then the Los Angeles terminal railroad, they skirted the bluff on the west side of Los Cerritos and Long Beach and their stakes. These were all washed out in 1891. Governor Gage, in 1884 and along that date, used to drive from Long Beach to Los Angeles in a light rig, on account of the badroads across the valley, and as much as a month at a time he would not be able to travel through there. The Bixbys used to keep a flat bottomed scow on the east side of Los Cerritos to carry the people out of the flats during high water. At one time several people came near losing their lives by being surrounded by high water and unable to get out.

Mr. Denic knows and has known a great many of the old settlers of this country.

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20
Mr. Wm. H. Workman
224 Doughal Bldg., L. A.

Mr. Workman remembers the floods of 1862-67-76-84 and 89 and more particularly about the Los Angeles river. It was commonly understood and talked of in early days by old Mexican people that the Los Angeles river flowed out through the southwest part of the city by Ballona and into Santa Monica Bay until the flood of 1825. At that time the floods were probably the greatest for a great many years, when the river broke eastward into San Pedro Bay. Many people here told Mr. Workman that this was the case. The floods of 1884 were perhaps the greatest in his memory. In that year immense amounts of water wood floated down or were washed down from the mountains and supplied fuel for a long time.

The country from El Monte southward was immense sheets of water, and around Downey, Clearwater, Compton and Watts the country was covered with water for many weeks after the rain had stopped. The country down around Watts, Compton and southward was all willows, and especially near the so-called bed of the river, where the willows were very dense.

The San Gabriel river changed its course eastward and flowed into Alamitos Bay. It rained for perhaps ten days without any let up, and even the hills on Boyle Heights were soft and so muddy that they were impassable. The river extended clear across the valley at that time where the Santa Fe Depot now stands, and other sections were all covered. Mr. Workman was primarily instrumental in getting the first bridge across the Los Angeles river. A bridge was very necessary in getting back and forth from Los Angeles to Boyle Heights.

In early days the Los Angeles river had its bed where Los Angeles street now is; later it changed over to Alameda Street, and in 1889 it changed to its present course. The river was at all times very shallow until efforts were made to confine it to a certain channel then it began to scour out as is clearly seen in the present channel.

Mr. Workman relates an incident of the flood of 1884 when Martin O'Geary, now a Deputy Sheriff, rescued a woman from drowning on upper Alameda Street by riding his horse into the stream and bringing her out.

The floods of 1884 threatened his lands, and especially his apple orchards, but by keeping a force of men working for some little time he was able to divert the stream away from his place. One of the means by which he did this was to get a big gum tree and anchor the roots well into the solid bank, and then let the top drift down stream against the bank. This effectually turned the water and stopped the cutting.

22

Mr. Geo. Kuhrts, Chief Engineer, Los Angeles, Ry., P.E. Bldg.,R.752

Mr. Kuhrts was seen at his office, 758 P. E. Bldg. on August 7th and was glad to assist in any way he could on the work in hand.

Mr. Kuhrts' family has been in this county for a great many years, before the time of John Temple and Jotham Bixby. His folks were ranchers and their herds of cattle, horses and sheep ranged in the valley between Boyle Heights and Los Cerritos. Mr. Kuhrts' father and mother tell of many interesting incidents of the early days.

In 1868 the valley was one vast flood; Watts, Compton, Artesia, Downey and all that vicinity was covered by water. Mr. Kuhrts father was over in Santa Ana and was on his way across the valley westward during the 1889 floods. He reached Los Cerritos after a great deal of trouble, but from there to the Dominguezplace it was a mass of sheet of water c lear across.

There is no doubt but that the Los Angeles River once flowed out through the soutwest through the Cienega. It was common talk and generally understood that in early years the river had its outlet into Santa Monica Bay. There are plenty of indications to show this in the gravel and olds channels out that way.

In a suit between the (Nadau Vineyards and S. P. R. R.) there were witnesses who testified to this fact and as having seen the river flow out through the S. W. (I shall look this up)

The San Gabriel River had three distinct channels where the P. E. R. R. crosses From Dominguez Junction to Los Cerritos, and they were allowed for in the construction of the P. E. R. R. line. It was often wondered at why they had provided so many openings, but Mr. Kuhrts says he knew the conditions and the vast amount of water that came down the valley and this was his protection.

In the flood of 1889 it was a question which way the Los Angeles River would turn, to the southwest back to its old channel through the Cienega or to the southeast. The S. P. R. R. bridge was an obstacle that came near throwing the river back to its old channel, and this is what brought about the lawsuit between the Madeau Vineyard people and the S. P. R. R.

The floods of 1868 caused the change of channel from the old San Gabriel River into New River.

The San Gabriel River continued in the New River channel until 1889 when it again broke westward for a time and emptied into both Los Alamitos and San Pedro bays. However, in 1891 it turned back into Los Alamitos bay and continued up to 1912 when it again broke out to the westward again.

The floods into the Los Alamitos bay have been very beneficial to lands on the east side of Los Cerritos. In many places and especially in the channels, the ground has been filled in 12 to 15 feet. It has been the making of a great deal of the alkali lands and has raised the swampy lands into fine beet and corn land.

The low lands below Sherman Heights in the southwest were all considered swampy lands, and were grown up with tulies.

The low lands southeast of Pasadena and east of Knob Hill were once swamps.

People began to sink wells for irrigation purposes and this began to lower the water plane and then the marshes began to disappear.

All down through Artesia and in that section of the country, there were plenty of artesian wells. A settler would get a well put down and then begin clearing off land for his farm. As the number of wells increased, the flow of artesian water decreased.

An instance of this underflow was when a man named Raymond, below the Raymond Hotel, Pasadena, put down a dug well eight feet wide by twelve feet long. During the night an unusual noise was heard in the well and the engineer could not understand it. The next day, upon investigation, they found the water had broken up through the thin layer of material remaining between the water-bearing strata of sand and gravel and the bottom of the well where they had left off work, the day before. Then it showed an underground flow of water, and it was the wash of the water that they had heard through the night.

The San Gabriel River through New River emptied into Los Alamitos Bay, but it became an open question as to what was really the delta or mouth of the river. Some contended that it was the eastern neck and others that it was the western neck of the bay. It used to overflood all of that country until it was a veritable sea of water.

Mr. Kuhrts saysit is a mooted question as the to cause of the New River channel and where the river should flow. It was also by, so to say, only a turn of a straw as to whether the Los Angeles River would go back into its old channel through the southwestern part of the city Ballona Bay or to the southeastward. There was a suit in the courts about 1890 over damages caused by a railroad bridge, and the fact was brought out by the testimony of an old Mexican that the Los Angeles River once flowed southwesterly into Ballona Bay, and that was its former channel.

25
Judge C. Sepulveda, Room 1126 Merchants Bank Bldg.

Judge Sepulveda was seen at his office on Tuesday morning, August 11, as to the floods of his time.

His father was born here and he also, and has some relatives here, but the ones who would know are dead. He says, however, that the Los Angeles River once flowed at the west side of the valley right up against the bank near the Plaza, and down along what is now Los Angeles St. and thence to Ballona Bay.

In 1825 there was a big flood and the channel of the river changed from the bank near the Plaza to the eastward and turned into the San Pedro Bay.

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25
H. Greenawalt:

Mr. Greenawalt has lived in Los Angeles thirty-two years, and has seen some big floods. When he came here Los Angeles had its bed along what is now Alameda St. During the big floods water would come almost into 6th & main sts. and run back into Agricultural Park and out through the southwest. In 1884 there must have been from forty to fifty houses washed away. Of course there were only small houses, yet the water exhibited a great deal of force. Says Martin O'Geary exhibited great bravory in rescuing people from the river by riding his horse into the stream and bringing them out. Says that A. N. Hamilton once had a dairy in the southwest part of town, and several times Mr. Hamilton told him that water came in from the river and flooded his place.

The river bed was higher than Alameda St. and only for the level would have come at every rise of the river. But as it was only when the high floods came and the water broke through Alameda St. was flooded.

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26
Dr. Carl Kurtz, 317 Doughlas Building.

Mr. Kurtz was seen at his office and disclaimed any knowledge of the floods of the river, although he was born here. He says the floods of 1886 and 1889, but that probably the 1914 was the largest of them all. He says although all the bridges were swept out of the

86's that they were only light structures and could not offer much resistence. He does not believe that there will be any trouble to confine the floods to the channels of the river if the work is well done and properly repaired. He thinks the levee should be extended further south to stop any possible overflow towards Jefferson St. However, he does not think the river ever broke through in that direction and is incredulous about the Los Angeles river having once flowed into Ballona Bay.

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26
Mr. A. N. Hamilton, 403 Germain Bldg.

Mr. Hamilton was seen at his office, Tuesday afternoon, and proved to be familiar with some phases of the floods. He came here in 1872. He was engaged in the cattle business in the southwest near the Cienega. In the winter time the water came up and the stock had to be taken out of the low grounds.

In 1884 Mr. Hamilton had his corrals and house at about Washington and Figueroa Sts. The rains began on the 7th of February 1884, and there was little let up for about thirty days. The river began to overflow and Mr. Hamilton began to get uneasy about his cattle, which were in the corrals. The cattle were lowing and began to get uneasy. To make matters worse, with Mr. Hamilton however, he was sick in bed. But something must be done, so he got up and went out into his corrals, got the cattle out and onto higher ground. The water was as deep as three feet in places and he could not tell how much deeper it would get.

This water came, mostly from the Los Angeles River, breaking out fromthe river channel in AlamedaSt. about 14th St. Then it flowed out through the southwest by Exposition Park through the Cienega and into Ballona Bay.

It was well understood among people in the southwestern part of the city in those days that the Los Angeles River once flowed out through the Cienega and into Ballona Bay.

In the flood of 1889 M.R. Hamilton was in Santa Ana and wanted to get home. It had been raining for many days and the country was flooded. At last a dash was made on the train and they got through before the worst had reached them. The river here at Los Angeles was a mile wide and the country below was a sheet of water.

28
Mr. W. R. Patton, Los Angeles & Whittier Road, Rivera.

Mr. Patton was seen at his home on the Los Angeles & Whittier Road about a mile east of the San Gabriel river this afternoon, Sept. 4, 1914 by F. Z. Lee.

Patton is greatly interested and concerned over the proposition of controlling the San Gabriel river and protecting the people and their properties against the floods. It is time something is done for this matter, and not be put off. Enough work could be done to keep the river from continuing its destructive cutting away of valuable property, and at the same time fit in with the work that is now contemplated by the county on the flood control work. It has been protested by the Supervisors that it would be money spent which would not fit in with the plans of the board of engineers. We do not agree to this and think that it could be made a part of the general plan and at the same time afford us immediate protection.

Too, the Supervisors protest that they cannot and do not have the money to appropriate for this purpose, yet they appropriate thousands and thousands of dollars to beautify the county. To the sightseers this must not be a very pleasant sight--our orchards and lands washed away and make to look like desolation. Even a little help would be encouraging; some funds could be raised among the owners, but they have been carrying considerable expense already, having formed a protection district and been assessed to carry on certain work. But our supervisor seems to ignore our needs. He has been out here and has looked over the situation and knows what could be done, but we are not able to get anything from him.

Mr. Patton's property has not been damaged seriously but if the river continues to cut away the river bank just as it has done to the north and west of him, there will not be any safety from the floods for they will reach him too.

He came to Los Angeles in the early eighties and lived there until fourteen years ago when he bought land, first just to the west of where he now lives, from Mr. Coffman. This land overflowed the first year he was there and was a great disappointment to him for he intended to plant it to trees. However, he hadbought from a good man and an exchange was made for the present piece of property.

It is true that the plans for protection which are now being considered are going to cost a great deal of money, but there are particular points and districts which are now threatened and should have consideration since they depend for their very existence upon immediate action.

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29
Mr. A. Germain, Rivera

Nearly a mile east of the San Gabriel river on the Los Angeles & Whittier Road.

Mr. Germain was seen at his home this afternoon, September 4, 1914 by F. Z. Lee, and was glad to talk of flood matters.

He came here about nineteen years ago with his family and bought where they now live. In those days the San Gabriel river

was only a narrow deep channel and called the Rio Hondo. No one ever thought of floods such as came in the last four years.

He had 130 acres in cultivation in alfalfa and feed stuffs for his dairy and about 30 acres in walnuts. In the first flood 1910-11 he had his alfalfa fields washed out and destroyed together with all implements, two large barns, houses and other improvements about his dairy. That flood cost him about $25,000. Then the flood of 1912-13 and that of last winter has taken nearly all that is left. He has a small part ofhis walnut grove left, about three acres and his hous and small store.

He has done all that he could in the way of protection and now he is not able to do anything. The floods have done him so much damage that he has little left. His hope lies in protection from the floods. It will be years before hisland will befit for anything as it has had from two to three feet of soil washed off of it and now it is a bed of sand and gravel. It will be no good to do anything until the water is kept off the land and that cannot be done until the river is placed in a channel and kept there.

Mr. Germain and his sons have been told by Vincente O'Geary that his mother told him she has seen the whole valley smooth and level, that the river was liable to drift anywhere, but very shallow. It did not cut deep washes, but spread out and did not damage. On one occasion Vincente's mother spent two days and one night in a tree, only a short distance southwest from this place, waiting for the flood to go down. The water spread all over the valley in one solid sheet but too deep and swift to get out.

31
Mr. Geo. N. Place, 953 W. 7th St., L.A.

Mr. Place was seen this morning, August 31, 1914 at the Pioneers' Club rooms, 953 W. 7th St., by F. Z. Lee.

Mr. Place came to Los Angeles in 1876 and has been interested in the newspaper business. In 1884 he published a weekly called "The Phoenix" In his estimation the flood of 1884 has been the largest in his experience. It took away every bridge except the old covered bridge at Aliso St. The river channel was always shallow and when the floods came the water overflowed and lowlands of the river and went wherever the ground was lowest. The water used to go down Central Ave., sometimes going east and many times west of Central Ave. He has seen the water three feet deep on Manchester and Central Aves.

In 1884 the floods covered all the lower country and at Compton he has seen rowboats going about from place to place to buy supplies.

In early days the Los Angeles river used to flow a good ways beflow Los Angeles and there was always water in the river. But now, so much water is taken up by irrigation that the river no longer flows.

Last winter the Los Angeles river came near breaking out and would have had the heavy rains continued for half a day longer. Should another storm come such as they had in 1884 it would flood the low part of the city and do imense damage. It would break out above the Santa Fe Station and flowwestward for all the water drains westward from there to Alameda St.

The big floods cannot be held by ordinary riprapping for the water gets in and behind and below the big rocks, whips the sand and gravel out from under them and lets the rock down into the deep sands where it does no good. The riprap would be all right if the small interstices were filled with small stone and then grouted with cement to keep out the water.

In the early days before the streets were paved during the wet weather they were a lake of thin green slimy mud from a foot to eighteen inches deep. The S. P. R. R. used to have a depot at San Fernando St. and a stub line brought the passengers down to Marchessault St. The old car used to get off the track real often and then everybody would have to get off into this mud and help put the car on the track before they could go ahead. The man remarked that now he was into it he might as well wade ashore.

Mr. Place once roomed across the street from the First National Bank when it was on Main St. opposite where the Post Office now is. One moonlight night he looked down Main Street and the green slimey mud of the street glistened and shone as so much melted glass.

The floods of 1914 were not so large as those of 1884. While they did a great deal of damage, there was not as much water.

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32

Mr. Randall H. Hewitt, 529 Merchants Trust Bldg.

Mr. Hewitt was seen at his office this morning, August 31, by F. Z. Lee. He came to Los Angeles 1876, and being connected with newspaper work for a great many years, attained intimate knowledge of the conditions of the country and the actions of the Los Angeles river since that time.

The year 1876 was a dry year and no water flowed below what was called the "Toma" in those days, above the Downey St. Bridge, which is now North Broadway, where the boys used to go swimming.

The first big flood was in 1884. There were two sections of it. The first came down in the latter part of February, but did little damage. A great quantity of water fell and the country was very well soaked. Every one thought the storm was over. The City Council had been forced to take notice of the great danger the city was placed in should another flood come of equal magnitude or even greater.

To this end, Capt. Thom, who was then Mayor, appointed Mr. Wm. M. Humphries who had had considerable experience in fortifying

rivers against floods, Mr. Mullhassen who had done notable work on the Changres river, and Mr. Hewitt. Mr. Hewitt says he did not have the experience that Capt. Thom thought he had although he had witnesses and experienced the actions of rivers in the east.

At this meeting when it was decided to take some action to protect the City against overflow by the river, Don Antonio Coronel told them that there was a map in existence among some of the old early citizens which showed the river flowing along the bank which is now 6th St. from the southwesterly into Nigger Slough and into Playa del Rey and Ballona. Don Antonio said the map was practically only a sketch map but clearly showed the relative location of the hills and rivers; that succeeding floods had gradually forced the river eastward in its channel to where it now is.

In Mr. Hewitt's mind there is not doubt about the river having once flowed out through the southwest as there are plenty of indications to show it.

But to return to the action of the committe appointed to investigate the river, before this committe had gone out to inspect the river, a second flood came down within six or eight days after the first one and this one did the great damage to property.

Where the Santa Fe Station now is was a fine vineyard; about First St. there was a fine orange orchard, and the land was, in fact, cultivated along down the river as far as Ninth St. Mr. Wm. Workman had a fine place over towards Boyle Heights side of the river. However, the greater damage was done on the west side of the river.

The water broke through the levees and over the lowlands and where the Santa Fe Station now is the water was three feet deep. All of this water flowed westwardly into Alameda St. Some 41 horses were washed away in the lowlands near First St. and below. In those days the streets ended at the river. The people built their houses on the sand and when the floods came lost them.

At the intersection of First St. and the river a test was made for solid rock or good foundation. A "divining" rod 70 feet long was sunk its full length and no bottom was found. There was nothing but sand and gravel all the way down.

All of this country has been filled in and for thousands of years material has been washing down from the mountains as is attested by the mammals being found six or seven miles west of here.

The old winery of down about 9th st. was completely washed away. The first recovered some of their goods but a great deal was lost and much taken up by people who found the bottles and casks of liquors scattered about the country. Six or eight years after the flood a man was ploughing his field when his plow struck something solid. It had a peculiar "feel" to it and he investigated and found a ten gallon keg of brandy buried there.

The S. P. had an office at the east end of the Aliso St. bridge. The flood carried off the office and everything else. There was an iron safe in the office but it was washed into the flood and never found. I sank into the quicksand and was lost. A man had a laundry on First Street near the river. He had a small engine and boiler to operate his machinery and to pump water. The floods came and partly washed everything away. He found his boiler out on the edge of the river got some rope and thought he had secured it from being further washed away. The next flood, however, carried it away and it was neger recovered.

The early days the lands were alloted to the Indians by the Padres. There was no price upon the lands. They belonged to the Pueblo but there was a condition. The Indian could take a s much land as he would protect by planting willows and canes along the river front to protect against overflow. Later on these lands began to be taken up by Americans, after the acquisition by the United States from Mexico. The figures made by the cross threads in a spider's web were more nearly rectangular than were these flats formed by the fences of the Mexican and Indian squatters on the river lands. The streets were partly formed after the original lines, although some of the streets were cut through.

After the flood of 1884 a company was formed to build a railroad from Los Angeles to San Gabriel. It became known to a few people that there was a great trans-continental railroad behind the project. The city gave them a great deal of land for yard and building purposes, and helped secure right of way over private properties. After all this was completed the Santa Fe came in and acquired the San Gabriel railroad project.

The city, at that time had decided to protect the west bank of Los Angeles river as much as possible and were going to build bulkheads to form a stable bank for the river. The committee ordered by wire about $40,000 worth of lumber from Oregon Mills to be shipped as soon as possible. As soon as the Santa Fe people took over the San Gabriel railroad proposition, they then asked to take over the entire order of this lumber ordered by the city and with a permit to carry on the work of protection projected by the city in this case as it was a matter of protecting their right of way.

There was quite a lot of large rock used as riprap along the river. As the floodscame the waters worked in under and behind the rock gradually let it down into the quicksand and out of sight.

The floods of 1867-80-91 and 1914 were not as great as that of 1884. They have dropped more water in some periods in a shorter time but there was not the same amount of water all over the country as was in 1884.

After the flood of 1884 the city authorized a survey for an official channel of the river. It was finally laid out where it now is with a channel of 300 feet but the railroads have impinged to some extent and there is not that much channel now. Possibly the channel will carry the water ordinarily, but not in such floods as that of 1884.

The Arroyo Seco brought down more water than the Los Angeles river last winter. There must have been very heavy rains on its waterhead.

The incident of the 1884 flood was when both the approaches of one of the bridges went out leaving two cows and a horse on the middle of the bridge. It was several days before they could be taken off and hay and water was taken out to them.

It was by the heroic deed of Martin O'Geary in the flood in bringing people out of the river that he was elected Sheriff.

37
Mr. Jos. W. Wolfskill, 540 S. Ardmore Ave.

Mr. Wolfskill was seen at his home this afternoon, Sept. 1, 1914 by F. Z. Lee. He claimed he had very little knowledge of the floods for he was never out in them. He has no memory of dates.

In the early days the Los Angeles river had very low banks and when the rains came the river was easily overflowed. The waters spread over the country and did very little damage in those days. The water did not run so fast and did not cut so badly. The Arroyo Seco controlled the river at its junction because the fall of the Arroyo is so much steeper than that of the river. The flow of The Arroyo Seco against the bluffs has done much to turn the river to the eastward. Had this not been so, the river would be flowing where it used to, down near Main Street, as the banks at 6th down to 9th clearly show. The river has no doubt, flowed into the Ballona in early days, but before his time.

Mr. Wolfskills' father told him that in early days the valley down towards Compton was almost impassable, for it was covered with marshes and lakes and there was a growth of willows and some large cottonwood trees.

In those days it was dangerous to go into that country on account of wild animals, bulls and wild horses. To get rid of some of the wild horses, they drove them off the bluffs to kill them. The stallions would cut out the tame mares and herd them off and it was their only protection against those horses, to kill them off..

38
Mr. James J. Watson, 811 Title Insurance Bldg.

Mr. Watson was seen at his office this afternoon, Sept. 1 1914 by F. Z. Lee, relative to the width of the channel dredged by the Dominguez Water Company between the Dominguez and Bixby properties.

The channel was about 100 feet wide and at its beginning just below the Long Beach Boulevard concrete bridge it was dredged

nine feet deep to about a quarter of a mile above the P.E.R.R. bridge, when the depth was lessened to about seven feet. This was carried between three and four thousand feet below the R. R. bridge when it was allowed to run out.

The Company had a great deal of difficulty in dredging this channel as before it was finished a flood came and delayed their work for several weeks. On the section or attempt to finish the work they were again flooded and by a larger flood than the former one. This prevented them from completing the work and to make things worse, almost completely washed out everything they did. The water broke out above their work and only a part of it entered the channel or canal and between the washing effect of the waters outside the banks and the partly slack water inside its channel was filled up and the banks almost washed away. The work was completely lost and the money thrown away.

It would take a channel of at least three times as wide as this one to carry the waters of the Los Angeles river and the old San Gabriel river. It would not carry the additional water of the New River. In fact, the New River should be thrown over into the Alamitos Bay.

No plans were followed in dredging out this channel The line was agreed upon and then the work was startedby putting the dredge in there and going to work.

39
Mr. W. H. O'Melveney, 825 Title Ins. Bldg.

Mr. O'Melveney, Attoryney for the Dominguez Water Company. says that Mr. Mulholland was the consulting engineer on the channel dredged out between the Dominguez and the Bixby estates.

The costs were born by the Dominguez Water Company.

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39
Mr. Geo. W. Wright, 466 P. E. Bldg.

Mr. Wright was seen at his office this morning by F. Z. Lee. Has lived here for 30 years and has witnessed some of the floods.

The flood of 1884 was probably the greatest in his time. The whole country was flooded. In Los Angeles the water came almost up to Main St. and he has seen the water three and four feet deep in Alameda St. These flood waters would cross over Main St. and flow to the southwest into Ballona Bay. This was also the case in 1889. This was no doubt the natural channel of the Los Angeles River in earlier times.

The country called the Cienega clearly shows this as at one time it was all a swamp and always had three or four feet of water standing in the low places. The whole valley was marshy, swampy and

covered with tullies. Now that the water has been kept out of there to a certain extent and the valley drained, people do not suspect that is is subject to floods.

The floods last year did a great deal of damage and in some cases people have blamed the raidroads for some of the conditions, as the bridges held up the water until he flooded everything above them. The bridge or embankment would break and let a deluge of water down on the people below. Such was the case with the Laguna people last year. They are thoroughly sore about it.

The Arroyo Seco was higher last winter than Mr. Wright has ever seen it. The only way to account for this was that there were several cloudbursts in the mountains in its watershed.

The proposition of throwing the Los Angeles river into the San Gabriel is going to be fought by the people in the lower country. Such provision should be made for allowing some of the water to go down into the valley as those people are entitled to what water they want. However, the San Gabriel could all be put into the Alamitos Bay.

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40
Mr. Geo. A. Nadeau, Nadeau & Long Beach

Mr. Nadeau was seen at his home this morning, Sept. 3, 1914 by F. Z. Lee. He has been here most of his life and has seen some effects of the big floods, although he has never been bothered on his place.

His place is higher than the lands east of them which were flooded and he has no fear that he will ever be troubled by high water.

The flood of 1884 carried away the Nadeau vineyard, some of the houses and most part of the stock of liquors. It was just after the death of his father and the winery was leased to a man named Cola. An instance of the force of the waters, there was a double-ended cask which held 2000 gallons rolled along by the waters for several hundred feet. It was expected that it would go to pieces, but did not.

No one could tell where the waters would go, especially on the ground east of this place. A piece of land east of here between the rivers was for sale, and a man named Frank Cox, who lived just north of it, was the prospective purchaser. Mrs. Nadeau went over to close the deal. While she was there it began to rain, although there did not seem to be any prospects before he started out. The business finally closed; he started for home about dark. He had a top buggy but in spite of this protection he never was wetter. The next day the water came down and literally floated the Cox house away.

Mr. Nadeau has heard many times that the Los Angeles river once flowed out through the southwest and into Ballona Bay. All of the flooded lands were covered with willows in the early days, but the higher ground, such as thisplace, hasnever had any willows. In those early days there was very little wood in the valley, and they used to go down near Compton and cut the willow down there for wood. Then they began to plant gum trees, and at one time had 90 acres planted.

Mr. Nadeau thinks that the people who are flooded are practically the greatest beneficiaries and that they should stand the greatest expense of controlling the rivers. Thinks his land would never be flooded and will take a chance on that. The Los Angeles City business men would be the greatest beneficiaries of San Pedro harbor and should therefore pay for it. However, he believes that something should be done, but not much interested.

The wells in this section are supplied frommountain sources. The first water belt is about ahundred feet down, then another at about 150 feet. At 450 a good supply was struck. There are many stratas of water bearing gravel in the section, but all come from the mountains. To throw the flood waters over into Los Alamitos Bay district would not affect the supply any.

42
Mr. S. B. Reeve, Civil Engineer & Surveyor, 844 Title Ins. Bldg.

Mr. Reeve was seen at his office this afternoon, Setp. 1, 1914 by F. Z. Lee. He has been in Los Angeles County since 1878 and has been a close observer of the floods.

The first flood that mounted to much, and in Mr. Reeve's estimation, the largest he has ever seen, was that of 1884. In those days the Los Angeles river practically had no banks below Seventy St. and very low ones above that point. That floow did not do so much damage in some ways, as the flood of last winter, for the water spread out and, because there were trees and brush and other obstructions on almost all the land, the velocity was slow.

The people did not realize how much the water would rise and, therefore, built their houses all over the flats, then when the high water did come it did great damage and caused much suffering. A few lives were lost.

The water broke out of the river banks and flowed towards Alameda St. which is lower than the bed of the river. The water came up half way between the Los Angeles and Main Streets on First, and also flooded the lower portion of the city. At Maple and 24th St. the water was between three and four feet deep.

The floods poured westward along the then Washington Road and Jefferson Street, towards the southwest into Ballona Creek and into the Ballona Bay. All through the soutwest, clear to the sea, was a solid sheet of water. All of the country called Cienega was a great lake. Nigger Slough was swelled to great proportions, and

all of the country back of Venice was a sea of water. Last winter a great deal of water came from Los Angeles and flowed into Venice as everyone knows.

There is no doubt in the world but that the Los Angeles river had its bed out through the southwest. There is good river sand down only about three feet on Maple and 24th St. and it is easy to follow the old river bed out through the southwest by these same signs.

Mr. Reeve used to live out near Jefferson and Vermont and they considered it away out in the country in those days and miles from where anyone lived.

The flood of 1884 washed away the Nadeau vineyards and a large number of houses in the lower part of town.

But the floods of 1889 a great deal of water from the Los Angeles river passed out through the soutwest into the Ballona, and none of the water from the Westlake district gets into the Los Angeles river. This all flows to the soutwest.

Then the first big aviation meet was held at Dominguez field, Mr. Reeve was chief engineer of the fields. He had a great deal of work to do in February. It had been raining a great deal and he was uneasy that he would not get the work completed. One Sunday he had rushed his men out there to do some work and along about noon noticed that flood of water that was then coming down the valley. It spread out so much and looked as though there would be difficulty in getting back to town so he called his men off and caught an electric car to the city, which proved to be the last one in that day. The whole valley was one mass of water.

Mr. Reeve with an engineer from the east went over the problem of controlling the Los Angeles and San Gabirle rivers, went over the ground and examined the proposition thoroughly. Both having a great deal of experience watching the actions and effects of the flood waters, proposed a scheme of procuring right of way for the riger channal, and beginning to do something. In this way the people would get the assistance of nature and soon there would be a well-defined channel.

This channel need not be so big at first, merely make a start for the water flow in, throwing the material back each side and keeping it unobstructed. The right of way must be ample, say, a thousand feet wide to allow for a big channel, for a little dinky thing would not do.

All of the water from the San Gabriel could be readily handled and at a moderate cost. If this work was only started in this wa y, they would have some immediate protection and at last, by the time the bond election was held, there would be a good channel for the river.

The idea of spending millions of dollars for such work as has been talked of will not be money well spent. Those little dams on the tops of the mountains will not do any good. They will not hold the water back for they will fill up in a short time and become useless. So why spend all this money. Let nature help in this matter of making a channel for the rivers.

It would not be much trouble to get a few of the old timers together and make up a map of the old flooded district, and make plans whereby the river could be readily controlled. But the way the proposition is being handled only makes salaries for some engineers.

Mr. Reeve once had a map showing the flooded areas in 1884. There is now inthe City Clerk's office a copy of a map made in 1848 used in the suit between the City of Los Angeles and the old Water Company when the city acquired the water plant, which he believes shows the old river channel. There is also another in the City Engineers office and probably the same.

The railroads are largely to blame for a great deal of the damage done by not providing ample water way and also in obstructing the present channel by pile structures. The water would back up behind the structures, overflow lands above the bridges until something would go out, either the bank or the bridge and then it would wash out everything below.

Mr. Reeve does not believe that the cost of the work of protection should be confined to any district, that aisde from twhat the Federal and State Governments contribute towards this fund, the entire county should stand the costs. It benefits all, and the water comes from the highlands and floods the lowlands and all should pay.

The origin of the artesian water has a source back of the lands flooded by the overflow the river. Any flood water that is taken into the ground is only surface water, for it can not penetrate the first strata of clay or hardpan that is found soon after starting almost any well.

On many places water comes to the surface, and that is caused by the impervious strata running out to the surface, and thus forcing the water to appear.

The real source of the artesian water comes from the mountains, some of it a long ways back. There is possible some water taken into the ground at the mouth of the canons on the big gravel beds. These deposits would drink in large quantities of water if there was a place for it to go. It is hard to say if there is plenty of storage for it below the limits of the gravel cones. If this capacity is small, that is if the strata leading away from the gravel bed is thin, it will not store much water. However, if the strata or stratas are thick, and the water could be held on the gravel beds for any length of time, a large amount of water would be taken up, which would be very beneficial to the artesian water supply in the lower country.

In some localities water--and plenty of it--is found at a shallow depth, while in other localities, perhaps very near too, it is necessary to go to considerable depth.

There are small differences in the various stratas of water, but nearly all are clear until great depths are reached, then the water is yellow and seems to have some sulphur in it. It is all good water, however.

Now to sum the proposed flood control poropsition up, it seems to me the city of Los Angeles should furnish a half million dollars, and the county by taxation, could appropriate another half million, and with this amount they could put a good engineer into the field, make surveys of the river channels, getting them as straight as possible, and begin work. It does not seem to me to be necessary to spend millions of dollars to control the rivers. By opening up a channel with steam shovels getting the water started and allowing Nature to help, there would be a channel for the floods when they came; but now, perhaps big rains will come this winter and nothing will be done. There is too much politics and red tape inthe matter.

The banks could be made and set with willows and the main channel kept open, giving the water a chance to get away, then the people would begin to derive some benefit.

It seems to me, however, that the plan which the Board of Engineers seems to be working will result in numberless lawsuits against the county. None of those water companies and private pumping plants are going to have their water rights taken away from them without some kind of a protest, and that will be in the form of lawsuits. They have certain rights to the water along the rivers, and they are not going to lose those without strenuous effort.

47

Mr. F. A. Coffman, Rivera, Cal. Cor. Whittier & San Gabriel Roads.

Mr. Coffman was seen this morning, October 20th, 1924 by F. Z. Lee at his home. He has lived in this locality since he was eight years old, and has been a close observer of the floods and also of the water conditions of thispart of the valley.

There have been many big floods, but prior to 1867 none of them ever affected any one. In fact, until 1890 the floods did not call for any attention. The overflow of the rivers never did any special damage, except sometimes a house would be washed away, otherwise the ground was merely overflowed, and we really believed it did good inst ead of damage.

In 1867-8 what is called New River was formed by the river splitting up above El Monte, the new channel going to the east of that place.

There is some confusion about what New River really is. Some people call Lexington Wash the New River, but there was never any water went over that way until 1890. Lexington Wash broke

The principle of handling water is the same whether in small irrigation ditches, or in large streams. It is not necessary to form a solid bulkhead to turn water. A solid resistance is not as good as something more flexible. For instance, the roots of a tree bring destruction upon itself, for the water seems to get a leverage from the resistance offered by the roots. But, to prevent cutting, it can be done by allowing the tops of brush or other similar growth to fall into the water against the bank. This produces a certain amount of dead water, and acts asa cushion, which prevents the force of the current from reaching onto the bank and doing the cutting. We practice this on our ditches. The water begins to cut away the bank, we pull up a large weed, break off a small branch of a tree or a short willow stick, and put the butt end into the bank just above the cutting, allowing the top to float down stream against the bank. This creates some dead water, and the cutting stops.

This is the case on New River, just east of here. The banks are low, and when high water comes it spreads out over the low banks. These banks are covered with willow, and when the water gets back into the undergrowth its velocity is checked and it becomes more or less dead water, that is it has a very slow movement. When the water begins to do down in the main channel this dead water drains off and does no harm. Of course the channel of the river is kept clear of growth, allowing a free passage of the water.

This is clearly illustrated at the Foster bridge and at Mr. Houton's place. Mr. Houton had some trouble a few years ago when there was a flood. It began to wash him out some. He planted cane along the banks. Another flood did not come again for three or four years.. By that time the cane had a good start and no damage was done, for the cane effectually turned the water. In that way banks can be made which will not cut away.

The present channel of the New River is wide enough, and wherever the cane or willow grows along the bank it will not cut away. A good illustration of protection for banks was seen in the county road just east of here last winter. The water poured over the road two feet deep, and it did not cut any on the upper side at all, in fact the ground off the road was filled in to about the same level as the road. On the lower side of the road the drop from the asphalt pavement cut away some. An embankment of that kind would offer good protection.

It seems that poor judgment is used at time by the Supervisors. For instance, three or four years ago at the old Mission bridge we went to see the Supervisors about getting a pile wing driven to divert the water so it would go under the bridge. They protested that they did not have the money, and did not know how they could get it. It would have required only about one thousand dollars to have done the job. The following winter a storm came along and washed away a portion of the bridge. It cost them four thousand dollars to make the repairs and put the bridge and road in good shape again. Last winter the same thing happened, only worse. It would not have stopped cutting then only for a little concrete abutment at the east end where the bridge now is. Altogether it has cost the county ten thousand dollars, and it is worse shape than ever.

The pile bents are not driven at right angles to the stream. If one goes up stream and looks down toward the bridge these piles look like a picket fence. Nothing could ever get through the bridge; it acts like a dam. It catches all the trees, rubbish, houses and other loose stuff that comes down with the first flood. All this catches on the piles and naturally the water cannot get through and away, so it cuts out at the end of the bridge. A small amount of work could have been done there to offer protection. It would have been made apart of the permanent work, for we know that the river has always been there. The hills are on one side, and that is the natural place for the river. This would have stopped the cutting to the eastward where so much land has been ruined.

The flood control project as a whole is a good thing, and it should be carried out as soon as it can be put into effect. It will place the control where it cannot be hindred or altered by small disgruntled parties. It is very essential to the safety and prosperity of the entire county.

53
Geo. E. Bouton, 854 Bradbury Bldg.

George Bouton was seen at his office by F. Z. Lee this morning, October 3rd, 1914.

He has lived here since 1868 but has had very little to do with the rivers, and further could not recall very much.

He said in the flood of 1867, when the San Gabriel river changed its course, that between the two rivers everything was flooded, and that on the east side near Whittier, it would swim a horse. This fact is particularly vivid for a man by the name of Boyd came very near losing his life by attempting to swim his horse across the river at this point, and only got into the edge.

The country from Los Angeles to San Pedro Bay was more or less of a swamp and marsh. The water did not damage in those days when it flooded the country.

The flood of 1884 was very bad, washing out all of the bridges, except one, the oldDowney Avenue bridge. A good many houses were washed away, and some people drowned.

One instance of the danger of the flood was that where a house had washed away and lodged against a bridge pier. George Bouton was tying timbers together to make a raft to push out into the stream and then let down to them with a rope, when Martin O'Geary came along and without hesitation rode his horse into the torrent, reached those people, and in two or three trips had rescued them. It was a plucky thing to do and I have always admired Martin for doing it.

Geo. Bouton at one time owned a lot of land down near Downey. He put down some wells and brought in some fine artesian wells, and the first put down.

There is an immense big body of water in this underground flow, and it is a question where it all comes from. In the early 70's a U.S. scientist came out here and investigated this great body of water. This scientist said that the water sheds west of this coast range of mountains could not furnish all of this water. He estimated that the Columbia River on the North and the Colorado river on the South carried away less than 1/5 of the rainfall of the plateau between the Rocky Mountain range and the Sierra Nevada, and that there must be an outlet for some of it somewhere. This, then, must be a part, if not all, of this outlet from this water shed.

It has been the practice of the fishermen at San Pedro when they arrived at about a mile outside of the beach, and about midway between Long Beach and San Pedro, to lower a jug weighted so it would sink and corked up so that when it reached a certain depth the pressure would push the cork in, and the jug would fill with pure, fresh water.

There is another place at Redondo where a great supply of fresh water empties into the ocean from the floor or bed of the ocean. There is a great hole inthe bluffs in the cliffs near Redondo, where no doubt, fresh water came in from some subterranean waterway.

In the well that Gen Bouton sunk, in some cases the water shot out 30 to 40 feet above the surface. This water, so far as he knows is all of the fine, pure quality as that at Long Beach, and of the same color. He does not know why it should be of that reddish, cherry color, although there is no foriegn or peculiar taste to it.

54 Mr. C. H. Thornburg, Newhall, Calif.

Mr. Thornburg was seen this morning, October 5th by F. Z. Lee at Room 211 Central Bldg.

Mr. Thornburg moved to Los Alamitos in 1881 and was a superintendant for Mr. Jotham Bixby for a great many years. In 1884 there was a great flood which covered the entire country. An instance of how much water there was between Long Beach and Wilmington. Mr. Thornburg had been cut off for three weeks. They had had no mail, and so he decided to go over to Wilmington and see what they had. Selecting the best horse he had, one that was cool and not excitable, he started out. There was water all the way over, and in many places it was cut out, so that when they would come to one of the washes, horse and rider would go down out of sight and come up again, and then it would be necessary to swim to the other bank. Finally getting across the valley, he stopped at a friend's, change his wet clothes for dry ones, and then attended to his business. The next day friends tried to dissuade him from returning, but he had 60 or 70 men at work, and it was necessary for him to return.

The flood of 1889 shows what the water deposits on the land. It is foolish to say that it hurts to have the land overflowed, for that is what made it. In the earlier years, part of the land lying east of Los Alamitos ranch was white in spots, when the alkali lay in cakes on the ground. After the flood these places were covered from a few inches to four feet deep with silt. The land would then grow anything.

Another instance: There was a long neck of a lake or slough that we did not care to fence around. We took a wagon and drove across this slough, planing and planting posts as we went along. The water came up to the bed of the wagon. This was the year before the flood. In the deeper places, the fence posts were completely buried, and in many cases the farmers would go along in their plowing when striking one of these posts, would dig down and cut it off. After the flood there was no more slough, it was completely filled up.

This same flood of 1889 flooded the entire country. The Santa Ana river came across the valley and united with the San Gabriel. The floods did not move rapidly, that is, there was not much current; still in about 24 hours, the greater portion of the flood had moved away.

The water would not do much damage if there were channels for it to flow in. The only question is, how would the lateral water be taken care of. The immense amount of sand and silt came from the banks cut down and the lands washed away. If it was possible to confine the storm waters from the hills to the sea in a channel, there would be but little sediment in the water. It is this storm water that does the great damage.

The channel need not be so very wide, but should be cut down some, that is, deep enough to produce a good velocity. This will carry whatever sand and sediment there is to the sea. That, however, should not, for it is the natural method of enriching the ground. The alkali and peat land has been turned into valuable land by having these deposits dumped on them.

This flood water has practically nothing to do with the flow in the artesian wells. The surface water is affected to an extent, but the deeper waters are not affected. The supply from the deep wells comes from away back in the mountains. In drilling the shallow wells for stock and light purposes the wells were only 80 to 100 feet deep. This was a clear or white water. There were various stratas struck as the wells were put down, and a good supply being struck at about 450 feet, another at 600 feet, and so on down to 950 feet. This last water was usually the best supply, but of a yellowish color. The water tested all right, but after a few days gave off an odor like sewer gas. Mr. Mulholland says this water travels through a kind of bog land, which has been covered with gravel, and the land subsided. It is good purewater, as good as any of it, only it has this yellowish color. The casing is cut at the various stratas and the water mixed, but it does not do away with the yellowish color. These artesian flows have had pressure enough to rise 40 feet above the surface of the ground.

In early days we had a pump set on a platform over the edge of the beach, and at low tide would pump from a spring for the cattle and sheep to drink from. However, when there were a good many wells sunk in the upper part of the valley the springs stopped flowing.

In the early days John McGarvin and many others have told me of being able to see the fresh water boil up in the salt water about 1/4 of a mile from the shore outside from Los Alamitos Bay. It was no trouble to distinguish the color of the fresh water from that of

the salt water and for that matter, get a supply if necessary. Just how deep it was to the bed of the ocean where this water came up it was hard to say. It does not take much of a stream of water with pressure behind it to make considerable of a boiling motion.

We have always wanted to put a well down below the strata of clay that is struck usually about 950 feet. We have gone into it 200 feet but owing to the right kind of well machinery we could not go on down. Our well drilling outfits were only sand drilling outfits.

58
Mr. D. Henderson, Compton, Calif.

Mr. Henderson was seen this afternoon, Oct. 5, 1914 by F. A. Lee at his home on Gibson road just north of Olive St. and about miles east of Compton.

He has lived in this section of the country for twenty-eight years and has had a lot of experience with the floods of the San Gabriel river. There is no knowing what or where the river will go. It fills up holes, sloughs, and even its own bed and moves off to another section of the country.

In 1889 when he was living on New River to the east of where he now lives, the floods played a peculiar trick. The last was not particularly much different from any other near there. There were a few low places, little draws left there by some former flood. Early during the night the flood began to come down, but he thought nothing of it. Next morning there was no water in sight but there was a deposit of sand and silt spread all over his place nice and level to a depth of about eighteen inches. The river had moved further west and left the deposit.

On this place last winter the water swept everything clean. On the west part of the land it was all broken up preparatory to planting when the flood came along and swept all of the loose soil off and some more, perhaps eighteen inches in all. On the east portion it left a deposit of white sand which rendered the land worthless for crops this year.

The river was cutting towards my house and threatened to carry it away. It cut a part of the county road away and perhaps but for the united efforts of the county forces, the Edison people and men I had helping me, it would probably have washed my house away. We put in 5000 sacks of sand there and large quantities of willows and all other brush available.

It is entirely a question whether a channel can be made that will carry all of the flood waters of such a storm such as last winter of 1889. There were such quantities of water that it looks impossible to handle it. However, excepting the extra heavy flood years, a channel could be cut that would carry the water. It would carry a portion of the great storms if the river did not leave it altogether. But when the river breaks out it fills up the old channel and makes a

new one somewhere else. I have a scheme of partial protection, although, as I say, I doubt if all the water could be made to go down it.

A channel of say 300 feet width should be made. On each bank willows should be planted as thick as they would grow. Then outside of these channel banks, say 500 or 600 feet, on each side, should be made another bank and that planted with willows and grass to make as heavy a mat as possible. This is to catch the floods should they break out of the inner channel. Between these banks, as well as in the river channel, the land should be cultivated. In fact, it can be made a self-supporting proposition by leasing the land to truck gardeners or others to plant light crops in. This would insure the channel being kept free and clear of willow growth and this give the water a chance to get away.

These channels would finally fill up and a new channel be made. The fall is not great enough to carry away the debris that comes down the river in these floods.

These flood waters should go into Alamitos Bay. There is a natural channel nearly all the way from the mountains to the sea, and at the time that it would flood, it would flow over land that is of least value, for it is all alkali land.

The country should pay an equitable price for the official channel of the river, but that is not going to keep them from having lawsuits for damages, etc. No property owner will feel safe near the river and that fact will lessen the value of their land.

It seems to me that the Board of Engineers have the cart before the horse. They should have gotten out their plans and submitted them to the people to show what they could do, that they were capable of successfully handling the proposition. Instead, they are out getting all the ideas, data and experience of the people who have had to fight these floods for years. I would like for them to show their hand. I think the proper thing for the engineers to do, now that they have started out this way, would be when they have their data together, and their plans formulated, to submit them to the people for their approval. The old timers could tell whether their plans would work or not. Perhaps they could suggest some things that the engineers had overlooked or would not be successful. Just as an instance, I know that Mr. Lippincott said the only thing that would hold against the floods were gum trees. Well, what is the river going to do while these gum trees are growing? And besides willows are much better.

What the people want is some action. I went up and talked to Mr. Henshaw about protection here at my place. He said that they could do nothing. Then I asked if he could not protect the country roads where they were threatened, but I could get nothing out of him. I went to see the Edison people and they agreed to furnish the material if the county would do the work. It is still pending.

A man from the road department was down here. I think his name was Johnson, who had a lot of expensive ideas, but principally hot air. He wanted to drive a line of piling about parallel with the flow of the river, which would do no good.

The supervisors can find ways of appropriating money for entertaining a lot of people here next year, who will do the county very little good, but to try to do something for the citizens of the county who deserve attention, who are poor and need some help--that is out of the question.

There is no doubt that the Los Angeles river once flowed out through the Ballona Creek into the Ballona Harbor. An old stage driver by the name of Gordon who was here in the very early years, and who carried the mail from here to Santa Barbara, has told me many things of the early days and that the Los Angeles river flowed out through the southwest into the Cienega and on into Ballona Bay.

Mr. Henderson in the early days used to go to the Ciengea to hunt ducks. He could walk around on the bog or peat and by jumping up and down on it, waves would be formed which would act just like when a rock was thrown onto a pond. The waves would travel out from there he was jumping up and down, just as rotten ice does. If one stepping off the peat and went down, he would strike the clay subsoil just as though it was solid rock. Out near the Cienega people could get water eight to ten feet down. They would get to this clay. Back as far as the University they would have to go down fifty to sixty feet to get water. Now all of this water has disappeared. The Cienega is practically dry.

This is possibly due to taking so much water out of the San Fernando valley. Now, when they begin to get Owens river water in San Fernando valley and begin to irrigate a great deal, I believe that the water will come back into the cienega.

The wells on my place are 110-115 feet deep. There is an unlimited supply of water. This well here at the house will afford 100 inches of water all the time and never seems to be affected.

Down near the clay strata the gravel is rather large, about as big as a hen's egg and even larger. There does not seem to be any kind of sand or small gravel at this depth. The reason I think is this, I know of wells near here which when they first came in could not be lowered. And now, they are dropping off in their supply. I think that there must be snad and gravel filling in back of each other and slowly shutting off the water. In the case of my well, I think that because there has been no dimunition of the water supply is that nothing has filled in behind the larger boulders to cut off the water supply. In the case of the other well, it is like forcing the water through a sponge.

The water in all the upper stratas in which water. The lower strata at abut 900 feet is the only yellow water. At first when the people began to use the yellow water they thought it injured the crops and for a time intended to stop using it. They ran it off in a ditch and it seems that by the aeronating process that all the objectionable qualities were carried off by the air. It certainly smelled bad enough for a time. Just why this water should be discolored cannot be explained unless it passes through some bog or marsh formation. These wells which have been slowly flowing less and less, if left, the water will rise just as high as they ever did.

There is one thing that I would like to have explained. Every year about this time the water begins to rise in the wells. Rains have not caused this. It could not be that the water could readily reach us so quickly. It is possible that because there is less pumping at this season that the water comes up. It is certain that the floods do not have anything to do with supplying this water supply. The water cannot go down through the clay stratas and it would not be artesian unless it was held down by these stratas impervious to water.

Suppose that they had 100 inches of water flowing into the gravel at the mouth of the canon. I think that a short distance down the country 90 inches would be found to be coming out of the ground.

Dams and reservoirs are all right in that they hold back some of the flood water, but can they put in these dams cheaply enough to justify the amount of water they would get out of it? This is something to be looked into. Still they will not be able to catch nearly all the flood water as it comes down the mountains.

Now, I think the engineers should submit their proposition. Let the people judge it before they get started to spending a stupendous sum that may not do any good.

64
Mr. D. M. Cate, Tres. Long Beach Imp. Co.

Mr. Cate was seen at Long Beach this P. M. (Aug. 21st)

Mr. Cate came to the valley with his father in 1864, and was one year near El Monte, then they bought the place they now have near Pico, on which his brother now lives.

Mr. Cate's estimation the flood of 1884 was the greatest of any he has seen. The winter was exceedingly wet, great floods of water falling in February and March, but the heavy rains continued into July. In Compton the water was deep enough in places to swim a horse. There was water all over the country for months, and was practically impassable.

The flood of 1867-8 was a great flood, and was the only one that did them any damage at their place near Pico. In that flood it washed away about half of their land, but the waters have never harmed them since that time.

The waters of Rio Hondo came from Lexington Wash, and the Lexington Wash is from the San Gabriel. There was very little water in the Rio Hondo before the Lexington Wash was cut through and carried the San Gabriel over that way. Originally the only waters the Rio Hondo carried were those from the small arroyo in the foothills.

There is no reason why the waters from the Lexington Wash should not be turned back into the San Gabriel. In fact, that is where the water belongs. The water should not be allowed to go into the Lexington wash at all.

In 1867-8 the channel of what is called New River was cut through from the old San Gabriel, and the flood was poured into Alamitos Bay instead of into San Pedro as formerly. Many attempts were made by people to turn the New River channel back to the San Gabriel, and viceversa by contending factions, each time some one trying to undo the others work.

The floods of 1884-5-6-7-9-and 91 formed a series of wet years, when there was water all over the low country formonths at a time. Since 1891 there has been no series of rainy years, and it is about time for them to begin again. There may not be any heavy or long rains this winter, but next year they will probably begin.

In 1884 there was so much water in the low country that a boat could and did leave the harbot at San Pedro, go north as far as Compton and eastward to Clearwater, Artesia, and southward into Alamitos Bay.

In 1889 the Los Angeles river broke through into the Laguna ranch, and its waters were comingled with those of the Rio Hondo and SabGabriel.

Something should be done toward controlling the flood waters. All water should be conserved that is possible by means of reservoirs. The gravel beds should be flooded so that they will take up all the water possible, and then channels made for the water than cannot be held.

Enough water runs to waste each year to irrigate the entire country. This water, or a portion of it, if held, would be the greatest boon to Southern California, for water is all-important to his country.

But when channels are made for the rivers they should be made straight with ample channel room to carry the water. Wherever there are bends or obstructions in the water courses, the water glances off and shoots into the other bank begins to wash and then nothing can hold it. Sandbanks even, with willows and other plants well set in the soil will not hold. There was a fine illustration of this neqr Mr. Cate's place last year. The water was diverted toward a thick growth of willows, and when the water went down it had cut a channel through this willow growth several hundred feet wide and half a mile long and eight to ten feet deep. The main thing is that the channel be kept straight and clear of obstructions. The waters will then run off and do no damage. This is illustrated by the shannel that Mr. Cate and about twenty other associates made in their locality and which still stands to show what can be done. This channel is three or four miles long, and has not needed any further attention than cutting out the willow and other growth that formed obstructions to the water.

Should a channel be formed for the river, then it would not cut away the country and carry it away into the lower levels and into the harbors. There wouldbe but little sand and silt carried if this were done, for very little of this material comes from the mountains. The great deposits of sand and silt seen in the lower levels, and which partially filled up the San Pedro harbor, were simply the great

amounts of soil washed away from the landsabove. There need be no fear of the channel filling up if the water is confined to its channel, as there is ample fall to produce the necessary velocity to carry any sediment held by the water.

The storms bring down immense boulders from the mountains and are carried down for two or three miles and are then deposited. These can be taken care of and the water from there on would be practically free from sediment.

It would be a shame to spend an immense amount of money trying to control the floods unless common sense be used. Very few engineers have any experience in controlling these rivers. Unless they understand the section and the action of the water and its resultant in this loose, sandy soil, it will be money thrown away. If they will take some advice from the old timers who have had to contend with these conditions for years, they will be able to accomplish something. Willows and growth of that character will not hold. It will take piling twenty to twenty-five feet into the ground to become effective.

There should be thorough organization, and under one authority to carry on the work. The federal and state governments should come in heavy on this work. It is an immense proposition, and unless it is done right, it would be best not done at all. The waters can be thrown either way, east or west, just so it is a southerly direction, There is plenty of fall to the country.

Mr. Cate has heard the Mexicans talk of the Los Angeles river having flowed into Ballona in early days, and thinks it entirely possible even today, for the water to go over that way.

Mr. Cate would not hold back on any proposition to do this work, but is very much in doubt whether it will be carried out as it should be done, and if not, he does not like to see the money wasted.

When Mr. Cate came here there were no willows and very few trees. Occasionally a sycamore, cottonwood or oak tree could be seen.

67 Mr. Andrew Joughin, 2320 West 25th St.

Mr. Joughin was seen at his home Monday morning, the 17th and gave some interesting data. Owing to lack of time the conversation was limited.

Mr. Joughin came to this section of the country in 1866. He was a small boy at that time and did not pay much attention to the floods as he has since that time. He has been in San Fernando Valley a great deal and has seen many destructive floods in that section.

The Big Tujunga is a very dangerous stream and carries a great deal of water. The winter rains come and during the cold weather deposits a great deal of snow on the hills on the headwaters of the Tujunga. There is sometimes four and five feet of snow on the hills. Usually a great damage is when the warm rains come and are in excess of the

usual amount. They melt the snows in the Sierras and cause excessive floods. The Little Tujunga is also of importance, for it carries considerable water although not as much as the Big Tujunga. United they cause the damaging floods, and really carry much more water than the Los Angeles river above the place where they meet.

The Pacoima carries considerable water. Its course was at one time just below the point of the hill where the County Rock Crushing Plant is now located. Mr. Joughin says it would not be very difficult to control the waters of the Pacoima and to turn it down into its old channel where it once flowed.

The Tujunga should by all means be controlled, put in a channel and kept from spreading over the valley. The floods spread out over four or five thousand acres of land and do great damage to sections in ordinary times. In big floods, they do great damage.

In 1884 the San Fernando Valley was flooded and from Chatsworth to Glendale was a mass of water. The Southern Pacific R. R. was washed out many times. The fill in a great many places was made entirely or rock to withstand the floods.

The reservoir above Chatsworth in Brown's Canyon, borke two times. The flood of 1874 caused this dam to break and it did great damage by flood. There were fine apple orchards around Chatsworth and many of these were swept away by this flood.

The Arroyo Seco carries a great deal of water and has done much damage. It should by all means be controlled.

The New River channel was said to have been caused by a man ploughing a few furrows, and from this the stream got started. Merely an incident at that time. The Rio Hondo at one time carried very little water and amounted to very little at one time. Lexington Wash, however, is what made the difference.

The Los Angeles river once flowed near the old Plaza and up to not so very many years ago, Alameda Street was the channel. There is no doubt but that the Los Angeles river at one time flowed out through the southwest through the Cienega, Playa del Rey and into Ballona Bay. There are plenty of evidences that this was so, but before his time.

Last year the floods did not do as great damage as they would had there been one or two wet years previous, and should floods follow next winter there will be immense damages, greater than ever before. During the dry years the gravel and sand take up a great deal of these floods, but if the ground is already saturated, then the floods do not go down, but wash and remain on the surface. There is no doubt but that work should be done and that immediately, to control the floods, to control the channels of the streams and keep them in bound.

The conditions will be found different when a few wet years come together and then a flood. More damage will be done than was done last winter. Mr. Joughin hasseen two feet of water near Angelus Mesa, there the Los Angeles Railway car barns are now located.

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69
Joe Bernal, Room 53, Temple Block:

Mr. Bernal was seen at his office today at noon. He was born and raised in Los Angeles, He has seen some big floods of the Los Angeles river, and considers that of 1914 about as large as any of them.

As a boy he was interested in the old historical incidents of early times and would listen to the tales of his elders with great interest. He had heard that the Los Angeles river once flowed near the Plaza and down Alameda Street, so oneday he asked an aunt of his about this report. "Yes," she said, "The Los Angeles river at one time flowedin its channel near the Plaza, passed at what is now Second and Alameda Streets, then to near Sixth and Los Angeles Streets, then in a southwesterly direction towards the Ballona for a long distance, then swung southeasterly and skirted the edge of the hills of Dominguez." Mr. Bernal's Aunt remembered the location because she remembered an incident in those days that fixed it clearly in her mind.

There was a family by the name of Reyes who lived at Sixth and Los Angeles Streets, and another family by the name of Botillo who lived near. The women of the family did all of their washing at the river, which was just below the house of the Reyes family. As was the custom of those days, as now in Mexico, the women would take their clothes to the river, get a flat rock, place it at the water's edge, and there rub and chug the clothes to get the dirt out. Some misunderstanding came up between the women as to their washing places and was finally settled by Mr. Bernal's Aunt. It was Mr. Bernal's habit to visit the old San Antonio ranch where lived the Lugo Family. He once noticed a strip of white sand extending away towards the Laguna Ranch, and asked Mr. Lugo where the sand came from. He was told that in 1825 the Los Angeles river flowed out that way and what he saw was the old channel. Mr. Bernal has never heard of the Los Angeles river emptying into the Ballona Bay, but is satisfied that the river at one time flowed in that direction.

In his boyhood days he used to go in swimming in the Los Angeles river when it flowed down Alameda Street.

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71
John L. Slaughter, 1022 West 20th Street

Mr. Slaughter was seen at his home this morning and was willing to give what knowledge he had of the great floods. He came to Los Angeles fifty three years ago and has witnessed many floods and changes. He considered the flood of 1861-62 the greatest of his recollection. He recollects when old Finias Banning used to freight between San Pedro and Los Angeles and between Los Angeles and San Bernardino. It rained so much in 1861-62 that the roads became impassable and how Mr. Banning's teams and wagons bogged up on all roads.

Where the Cudahy Packing plant now is, Dr. White used to have an orange grove. In this flood it began cutting away his place and carrying away his trees. Dr. White began to do something to turn the

current of the stream away from his land. He made mats of the willows and other trees andput them in against the bank to prevent washing. The efforts were successful.

Many such things could have been done in other localities had the people taken hold of the job in time. He thinks New River could have been prevented had the people around El Monte been more alert and wide awake.

Since his time here, the Los Angeles river has never flowed near the Plaza and down Alameda Street. The river may have many years ago, before even the Padres, flowed into the Ballona.

During the flood seasons there has always been loss by the floods, In 1861-62 there was not so much to lose; however some property was destroyed and some lives lost.

The people that are coming in here in these later days think that the old timers do not know anything of the floods, but unless something is done soon, there will be a great loss of life and property in the next big flood.

The valley of the Los Angeles river was filled, at one time, by willows. Back in the early '70's there was a willow grove just south of the Sainesavine winery, where the people used to gather for picnics and outings, where people used to go to spend a pleasant afternoon. This place with the Sainesqvine winery was completely washed away in 1884.

This winery was located where the Zobelin Brewery is now located.

Mr. Slaughter thinks something should be done and thatpromptly. The channel they have left for the river is too narrow for the big floods. Alameda Street will be flooded sometime.

Does not know of any old maps.

Mr. Slaughter has not been out over the country to tell of these big floods accurately. In the early days (the 60's) Mr. Slaughter lived with the Wm. Workman family, who has their home at Second and Spring. That was considered a lonw ways out in those days. Mr. Workman and Mr. Slaughter drove out from their home one Sunday, as far as the Cienega and there was only one house to be seeen and that was a ranch house on the side of the hill on the south side of the Cienega.

Mr. Slaughter remembers well the dry years of 1863-64-65 when thousands of head of cattle, horses and sheep died from starvation and thirst.

The people did not know that they could get water by drilling wells in those days. The water was shallow and the people would scoups out runways from the cattle to go down to drink out of the holes. The cattle would stamp around and horn each other, finally filling up the holes.

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72
Mrs. Isabel Tononi, 611 South Bonnie Brae Street.

Mrs. Tononi has lived in Los Angeles all her life, and she and her daughter, Mrs. _____ were seen at their home this morning.

Mrs. Tononi has a certain knowledge of the big floods. The Los Angeles river had its bed about where Alameda Street now is. She has never heard of the Los Angeles river flowing out through Ballona.

She has a picture of Los Angeles in 1857, showing Los Angeles Street, Main Street, the Plaza and the old church. The river in those days was at Alameda Street.

Mrs. Tononi says in the early days all the maps and deeds of the properties were lost in transferring them from place to place for safety.

It was said a well-known person of the city took possession of those maps and deeds and never gave them up. She had some difficulty in establishing her own rights to certain properties and had to bring up witnesses to prove it.

She owned land in the Cienega and in the R. Tajanta which is now Watts, and always considered the lands as marshy and subject to overflow in the big floods.

Mrs. Tononi syas that her folks often referred back to the flood of 1825 as being the time when the Los Angeles river made its big change.

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73
H. J. Stevenson, U. S. Dept. Sur., 211 West 1st St.

Mr. Stevenson was seen at his office Tuesday afternoon, August 18th. His ideas of the great floods are that in 1884 was one of the largest, although the 1914 flood was a close second.

It began raining on the 4th day of February and kept it up for about thirty days. He has some business in San Bernardino and left Los Angeles on the above date to carry out his work. He had finished his work, but as it had kept raining he knew that there were washouts on the S. P. R. R. so he did not go to the station to see if there were a train, merely kept asharp lookout with the telescope of his instrument for locomotive smoke. At last he saw an engine down the track and went down and asked the conductor if he would take him over to Los Angeles. So they started for Los Angeles, and by dint of hard work by the train crew and section men, the track was cribbed up so that they finally got into the city. It was a trying experience and never to be forgotten. Water was everywhere. It had carried out bridges, trees, buildings and had ruined lands and orchards.

The flood of 1891 was the most destructive in the Arroyo Seco. Before that time there was only a small wash, in fact, he had not noticed any big washes anywhere before that time. Then the floods carried away great bodies of valuable land.

Mr. Stevenson has made soil examinations and done other special work for the U.S. Government and for the state. It is his opinion that the flood waters could be conserved in the mountains and utilized in the irrigation of all these hills and valleys. The sale of the water would more than justify the expense. The storm waters should be kept out of the San Pedro Harbor. In fact, he says, the federal government should stand at least half the expense of this flood protection.

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74
Mr. S. V. Landt, 130 Stimson Bldg.

Mr. Landt has lived here continuously since 1888. He has property in the Arroyo Seco which was very badly damaged in the flood of 1891.

In all of his experience the flood of 1891 was the worst. There was an old man living on his place in Arroyo Seco, down on the lower bench just above the ____ Street bridge. It had been raining for about ten days steadily and the Arroyo was up and things looked very bad, and for this reason he had been looking around, then started home. He told the old man that the thought it would be a good idea for him to move his stuff all up on the mesa. The old fellow did not think so. However it was getting dark and the old man offered to accompany him to the bridge with his lantern. And too, the old fellow had placed a stick at the edge of the water and said he could tell if the river were rising. In trying to see the stick, the old man almost stepped off the bank into the river.

The water had risen and carried away his stake as marker, and also he came very near stepping into the stream--it had risen so much. So Mr. Landt told the old gentleman that he would go up on the hill and get some young men to help him move this things to higher ground. This he did and they then proceeded to the bridge. When they reached it, the water was then almost up to the bridge. In fact it was touching the bottom of the girders. So he told the old man he had best go back and get all of his goods out. Mr. Landt crossed the bridge and about this time a big tree came down and was dragged underneath the bridge and it made the bridge tremble. In about ten minutes the bridge was carried away. Large trees, houses and all kinds of wreckage began to come down. The water washed out one approach and made the opeinng much wider than before. The bridge was about 75 span. The storm did great damage to the land on either side of the Arroyo Seco. A part of his land was completely washed awa; part of a fine sycamore grove and some valuable land.

It was in this same year that Mr. Landt remembers most distinctly: He had some business in San Diego on a certain Monday in February, 1891. He left on Sunday afternoon and barely reached

San Diego. It had been raining and was then raining hard all the way to San Diego. All along the way they noticed that the streams were greatly swollen.

On Monday morning they were completely cut off from everywhere, by the floods. However, he finished his business and then was compelled to stay in San Diego exactly one week, when a boat came in from San Pedro in the afternoon and was to sail at 9 P.M. that night. There were a large number of people, tourists and others, who wanted to get out of town, so when they learned about the boat they rushed off to get passage to San Pedro. When they arrived at the wharf every possible space was taken and he, with some of his friends, were very disappointed that they could not get away.

However, they were joking about it as they were going back up town, when they met a newspaper reporter, who was on his way to pick up any possible news. So Mr. Landt and his friends began on this reporter telling him they could not possibly sail on that boat owing to her terrible condition, poorly manned, bad condition generally, rotten life preservers, and on top of that, another storm was brewing outside, like the one they had just had a week ago. Well, before they reached their hotel, the Extra papers were on the street telling all that these gentlemen had said. The result was that most of the passengers cancelled their passage.

Mr. Landt and his friends then went down, engaged passage and never had a more lovely trip to San Pedro. However, on reaching San Pedro they caught the first train that had left that point for Los Angeles since the storm, and even then it was only a makeshift at getting through and it was sometime before the track was up in good shape. This storm was the heaviest he has known. The whole southern country was covered with water and great damage done.

77

Mr. L. W. Head, 811 Orange Avenue, Long Beach, Calif.

Mr. Head was seen at his home on Monday morning Aguust 24th 1914 by F. L. Lee, and has a very clear idea of some of the floods and incidents with them.

He came to Los Angeles in 1878 and the flood of 1884 was the first, and by far the greatest in Mr. Head's experience. Conditions are different now from then, and yet the damage was by far the greatest in thatyear than any since that time. Perhaps then the country was not as open and the waters did not run off as readily as they did last year or in 1889, yet the year was memorable for the great amount of water that fell, and especially at one period and without interruption.

Before the rains began to fall, there was very little moisture in the ground, not enough to bring up the seed, and the ground was too dry and hard to work. About the 20th of February (approximately) the rains began and continued without interruption for about thirty days, and it was believed the sun was not seen during that time.

The ground became saturated, and then the water began to gather and collect, forming great lakes, and spreading out all over the country. There was water everywhere.

The Los Angeles river carried away the Nadeau vineyards, the sheds, warehouses and everything else moveable. The wine cask was carried out to sea and lost.

The S. P. R. R. was washed out for miles around Los Angeles and on the Santa Ana Ranch it was probably thirty days before there was any traffic on the road.

In Los Angeles, Mr. Head saw the water at Alameda and Commercial streets more than waist deep to a man. This is particularly remembered, for Mr. Head got a man to carry him across the stream at this point and particularly rmembers the depth.

Water stood all over the lower country for sometime and was practically impassable. From the west portion of Long Beach to Wilmington the water could swim a horse clear across. In 1884 the tides came in as far as Anaheim Road in many places, but that land is now all filled in five or six feet.

The floods of 1887-80-91 were not so great as that of 1864. As much water may have fallen during the year, but for any one period they were not so great.

The Santa Ana River hasoverflowed the entire country above Los Alamitos Bay. Water has been four and five feet deep in that section of the country from Santa Ana to Compton.

In 1907, or seven or eight years ago, there was a big flood. This was a peculiar experience. Mr. Head, with John Lee, who was planting beets over near the Alamitos sugar factory, started out one day after these floods to go out and see some lands. On the top of the hill, before going into the Valley eastward, they looked north and there was a vast body of water coming down from toward the Los Angeles River. It looked as though it was the Los Angeles River. Going eastward on the Anaheim Road they encountered water all along to the New San Gabriel River, but for about a mile and a half west of the river and as far as eastward, the water was found 3 or 4 feet deep. The water on the west side of the San Gabriel was apparently coming from the northwest and from the Los Angeles River. It seemed to join the San Gabriel River about Bola, and here the water was five feet deep, and had considerable veolcity. The valley between Long Beach and Wilmington has filled five or six feet since 1884. In the floods of last winter along the Anaheim road, that is along the Redondo Road, just west of Willowville, the land has filled in by marks shown on the fence posts, at least two feet in places. Year before last the Consolidated Lumber Company had the land which ran up to their wharvesfilled in by the floods. After dredging their channel out the floods of last winter filled them in again. They do not want to attempt to dredge another channel because the floods may fill them up again.

In the low lands below Alamitos Bay all of that portion was once low, swampy water soaked country. Only tulies, willows and some coarse grass grew upon the land. It was in the artesian belt and the springs flowed large volumes of water. If a cow or animal unforunately fell into one of these springs it could not get out and was drowned. The floods have been largely instrumental in changing this condition. The great deposits of sand and silt have transformed this land from a bog or alkali flat to a highly productive soil. This land was worth perhaps eight ot ten dollars per acre, almost nothin, and now it is worth 500 to 1000 dollars peracre. Of course, the land has been drained, too, but the silt has made the land rich. The bridge across Coyote Creek on the Anaheim Road was once 15 or 20 feet above the bottom of the creek. The tides used to come in there and back up for a long ways, and now there is perhaps five feet clearance between the bottom of the bridge and the bed of the creek. A fill of between 10 and 15 feet at the least.

The wealth of this country depends largely upon the amount of land under cultivation, and that is limited by the amount of water that can be conveyed and utilized for irrigation purposes. Now it seems that the engineers should, instead of conducting the water to the sea where its value is completely lost, conserve the flood waters and make them useful in irrigating the vast amount of land that only needs water to make every foot of it productive and valuable. That would mean millions to the country. It will cost millions of dollars to build channels and confine the floods to them. Why not use this vast amount of money to hold the water and thus make it do double duty by controlling the flood waters for irrigation purposes.

When those mountain streams are up and the torrents of water are washing immense boulders down the mountain sides, the noise of those thumping and pounding boulders in the bed of the stream sounds like distant thunder and can be heard for two or three miles. This grinding of immense boulders acts like a rock crusher, and produces large quantities of gravel and sand. This together with disentangled granite and other rocks, loose sand and silt, are carried down with the floods, and is the material that is filling up the low places and enriching our valley lands. Of course, a large part of the deposits come from the lands which have been washed away in the uplands, but the larger portion comes from the mountains.

When the Santa Fe Railroad came to Los Angeles the city gave them considerable land for yard and station purposes on the condition that they would control a portion of the river and prevent it from flowing to the westward. This they did by driving piling along the bank, which was successful..

11 THE LOS ANGELES EXPRESS
Notes taken from the paper

February and March 1884. February 1st. Fifteen inches of rain has fallen to date for the season.

February 2nd; The Poycoyma, Big and Little Tujunga are discharging immense amounts of water over the San Fernando Valley.

February 4th: On last Friday a man attempted to cross the Arroyo Seco with a fine horse and buggy. The buggy has not been seen, and the horse lies against a clump of willows just north of East Los Angeles.

February 5th: The Santa Ana River is on a boom, running clear through to the ocean, and cannot be fordad. Another horse has been drowned in the Arroyo Seco and people can now drive around by five mile house, preferring the adobe road to a ducking in the Arroyo Seco. The San Gabriel is still dangerous to crossowing to the speed of the riger and the change of the channel, and also the Arroyo Seco.

February 6th: The New River is flooding Downey City and vicinity In Las Balsesmany tracts of alfalfa and grain are already under water. It is almost impossible to understand anything about the symptoms of a local Southern California rain. The present one which commenced on Sunday a week ago at one o'clock A. M. has been one of our best downpours. (Today--Wednesday--10days rain)

February 7th: Thursday. Up to yesterday the rain for the storm by the Signal Service was 9.13 inches. As the rain is still in continuance by absolute total will be mentioned at the close of the present storm, if it ever stops.

February 8th: There has been a fall of 21 inches at Pasadena for the season. There has been no railway communication with Anaheim and Santa Ana for many days past, with the exception of one day. The Santa Ana trains run as far as Downey city and back on their usual time, about one-third of the distance to Santa Ana.

February 12th: The Santa Ana River is in some places 3/4 of a mile wide resembling a foaming Lake. There is a larger volume of water now flowing from this river into the sea than for 17 years past.

February 15th: Alameda Street is a veritable river. The greater portion of Sonoratown is practically flooded, especially thatportion embraced by Buena Vista, Virgin, College, and Castelar Streets. Travel on foot is hazardous and in every way disagreeable.

February 16th: Arroyo Seco is utterly impassable for teams at all crossings. The San Gabriel River is running to the sea, the first time since the spring of 1875. The Santa Ana trains are running only to Downey since the present rain.

February 18th: The Bridges and culverts are being washed away in every part of the country, and roads are impassable. A south wind Saturday night and yesterday morning blowing toward the mountains, upon which there was a heavy fall of snow all the way from 20 to 24 inches deep, melted it almost instantaneously, and the Pacoyma, the Big and Little Tujunga and Arroyo Seco, all joined at the Los Angeles River at their several junctions, and swelled its proportions to a flood, as stated by old residents, to exceed any flood since 1862-3. 21 years ago when the river deluged Alameda Street at the Arroyo Seco crossing, making the street lower than the bed of the river, as it is at some places at present. The same thing occurred yesterday although the water only washed in on the street between Macoy & First

First Streets. In what is known as French....
to the river, all houses were flooded from two to six feet deep. At 1 o'clock p.m. the river at East Los Angeles brdige was 900 feet wide, 6 to 18 feet deep, and running at the rate of 15 miles an hour. Shortly after the driftwood from the mountains began to drift down and weakened the bridge, and the passengers crossed the bridge on foot. About an hour or fifty minutes afterwards the Aliso bridge was undermined, and its supports washed out, and bridge rapidly going to pieces, was floating downstream, near to the First Street bridge, where that portion that held together lodged, causing the waters to back and flow westward into the city as described. The East Los Angeles bridge next weakened, and 100 feet of the east end was carried away, both street car and foot bridge. During the evening the bridge across First Street was also broken and more than half carried away and cannot be used. The railway trestle across Los Angeles River at the San Feliz Rancho, and the one across the river on the Arizona route, are gone. The houses commenced to float off in the flooded regions about 1 o'clock. The damage will reach over $1,000,000.

February 19th: The Cerritos Country and the New River country are all under water. The New River has changed its channel back into the channel which it cut in 1867, and is running through two channels at present. The Los Angeles River has made a new channel below the covered bridge through the Meinzer place, and down through the willows for over a half mile. Mr. R. Nadeau suffered a heavy wash through his 2000 acres vineyard near Florence, and lost many thousands of vines. There is a grand stream 15 miles in length, composed of old and New San Gabriel Rivers, and the Los Angeles river after they unite which made a terrible and grand old river to the sea.

Thursday February 21st: Since Friday of last week no trains have arrived here except one from Santa Ana, three from Santa Monica and three from San Pedro. The City Council in a body went down to the river to view the damage and see what could be done.

February 25th: The Santa Ana train which has not been able to make the trip through for a week or more, will probably be able to do so today or tomorrow.

March 4th: At no time since the recent flood have the street cars of the Boyle Heights and East Los Angeles Line been able to cross the river, the transfer from each side having been made over the bridges. The piles for the rebuilding of these structures were being sunk steadily, but the present rain will probably so weaken them they will have to be replaced by others. The bridges across New River and the Santa Ana River on the route to Santa Ana by rail are washed away again to a certain extent, and are so far utterly impassable. The railway between here and San Fernando, which has been dangerous ever since the recent washout, is again utterly impassable, while the Soledad Canon is again gone up. There is no knowing when we will again have communication from the north by rail.

March 5th: The Signal Service reports the present storm to be to date 4.8 inches and a total of 26.35 inches for the season.

March 6th: The river has accomplished little damage during the recent rain, partly because that much damage has heretofore been accomplished, and because evergreen boughs and otherprotection had placed in the more exposed and dangerous localities--the Hollenbeck tract was unprotected, and badly flooded, a house worth $500 being washed away--the river is falling slowly and will probably not do any more damage.

March 7th: The present season has dropped more rain than any other time since 1867-68. The railwaytrestle across the Los Angeles river, both on the northern and Southern routes haye been dangerous ever since the first flood, especially the latter one. This morning 70 feet of the west end of it was washed out by the flooding river, assisted by driftwood, rendering through travel in any direction impossible for a long time to come. Information reached us today that in addition to the swinging condition of the railroad bridge over the San Gabriel river, the piles have all departed, and the Santa Ana trestle is in the same condition east of Colton. The rainy season to date is as follows: The first storm of any consequence during the present season was on October 27th dropping 1.37 inches of rain. The third was on December 22,23 and dropped 1.00 inches of rain. The second was on December 3rd dropping 1.56 inches of rain. On Jan. 29-31 of the present year, the fourth rain dropped 4.66 inches of rain, followed by 4.65 inches of rain in the six days following. The fifth rain occurred on February 13-16 and dropped 2.75 inches. The sixth and present rain has dropped 9.74 inches. The rain in February which caused the flood, dropped 9.89 inches of rain, while the present rain dropped 9.74 inches.

March 10th: The river is utterly uncontrollable, and there is no telling where it may go without a levee. Formerly it occupied a space between the eastern bluffs and the mesa of Sonoratown in 1862-3. The soil is nearly all of a quicksand character, and the river may be onto Alameda street, flood the city and reach the sea near Ballona.

March 12th: The Los Angeles River, the Arroyo Seco and the Santa Ana and the San Gabriel rivers were still impassable yesterday. An estimate of the damage by the recent flood has been placed at $4,000,000. Notwithstanding the cessation of the rain, the damage to the railway appears to be worse than ever, and there is no idea when we will have through communication again. The Soledad Canon is washed out for the third time and the south end of the San Fernando tunnel is washed out for a second time.

March 14th: The change of the San Gabriel river from its old bed to its new channel of 1867-68 this year has washed away 350 acres of valuable corn land worth $150.00 per acre, or a total value of $21,000. Luckily its course did not take in or touch the Ranchito corn country.

From Downey--March 12, 1884: We have been greatly discomfitted the Greater part of the time for the last month and a half as all means of travel has been cut off from the outside world, with Old River on one side and New River on the east and the barbed wire fences of Mr. Thomas Bixby stretching from one river to the other.

March 18th: The San Gabriel river on this side of Fulton Wells is now fordable, but is still dangerous on account of quicksand.

March 20th: During the forty hourspreceding eight o'clock this morning, two passenger and three freight trains from the north and two passenger and three freight trains from the east hauled up.

86
Mrs. O. D. Thompson, 923 Alamitos Ave., Long Beach

Mrs. Thompson was seen at her home, Wednesday morning, August 26, 1914 by F. Z. Lee and was greatly interested in the floods. She has lived at Artesia for more than thirty years and saw some very high water. The country has always been flooded by the river. At one time 1884, the water came up into a house, a neighbor of theirs just north of where they lived, which was set upon a high foundation about five feet above the ground.

Mrs. Thompson came to Los Angeles across the plains, and reached there when there was only one house west of where the court house now stands, which was a small house about 10 x 12 occupied by negroes. The hill where the Court House now stands used to be a great playground for the children, where she played when a child, and was called "Pancake Hill." Mrs. Thompson once lived on Jefferson and Main, before there were any cross-streets cut through west of Main, and as a little girl of 13 went to Sunday School in the First Methodist Church in Los Angeles, which was on Hill and 1st or 2nd Streets. She lived in the home of Mr. and Mrs. Kundhill and knew them intimately. She has heard Mr. Kundhill tell about the Los Angeles river flowing out through the Ballona and she herself has seen the whole country a sheet of water from Los Angeles to Santa Monica.

She says although they have never been damaged by washing of the floods, something should be done--make the channel of the river big and straight and send the floods into the sea.

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87
Mr. Lafayette Saunders, 2303 Atlantic Ave., Long Beach

Mr. Saunders was seen at his house on the morning of August 26, 1914, by F. Z. Lee. He came to Long Beach in 1876 and settled on a piece of land which he bought between there and Wilmington. He built a home on the Hill St. road and was the first to start a settlement in that district. There was nothing in Long Beach in those days and the nearest house to his place was that of a sheep herder, probably one of Mr. Bixby's over near what is now Bixby's Park.

The valley was then a mass of willows, tullies, batamotes, and other swampy growth. It was only used for grazing purposes.

When the first floods came in 1881 there was perhaps about a mile of cleared land where he then lived, for several others had moved in. This flood of 1881-2 was perhaps the greatest Mr. Saunders

ever saw. They had three big floods during that winter and another in 1884.

Back in those days it usually took about 24 hours for the flood to travel from Los Angeles to Los Cerritos. In 1884 on one Saturday they received word that a flood was on its was from Los Angeles. Everyone made preparations against it.

They had a ditch whose head gates were up opposite Los Cerritos and took water from the San Gabriel river for their farms. On Sunday they were up there trying to protect themselves against the flood and which had broken into their main canal and was flooding things. They worked until about noon, putting in willows and other green brush and loose sand, but it did not good. They were not checking the water. Mr. Saunders then suggested that they use sacks filled with sand. It was a new idea and had been used but very little out here up to that time. It was objected to at first until Mr. Teel sided with Mr. Saunders, then they agreed to go home and gather all the sacks they could and return. The result was that they had the water shut off tight in about thirty-five minutes.

But Mr. Saunders then asked what good that was going to do. It would not keep the floods from rising over everything, which it did.

On Monday night about 4 A.M. Mr. Saunders heard the waters running and gurgling beneath his house. He did not want to frighten his wife and four children so he said nothing until daylight, then he took them and told them of the water as quietly as he could and said that they would get some breakfast and then go over on the mesa. So he got a boat and carried them out to safety on the mesa. The waters would go down and they would return, until this happened three times. The last trip he told his wife that three times was enough and that they would not go back again, which they did not and have lived near where they are ever since.

Mr. Saunders has seen the water along Hill St. from the mesa to mesa at least three feet deep. He and his wife went up on the hill and there was a perfect sea of water almost all over the valley and almost to Westminister.

Just after the floods of 1889 the Supervisors were down at Los Cerritos with their engineers looking over the porposition of building a channel to carry the flood waters through the valley. Every one had been doing some talking. The engineer told the Supervisors that it was perfectly sensible and feasable to make a canal 80 feet wide that would carry all of that flood water easily. Finally one of the Supervisors turned to him and said "You have not said anything about this proposition. What do you think about it? You have seen some of the floods." "Yes", he replied, "I have seen some pretty good ones, and if you can tell me how you can put a body of water nearly two miles wide and from two to three and one-half feet deep into an 80-foot channel and only six or eight feet deep, then that beats me. I have seen this valley solid across here between these mesas (Los Cerritos and Dominguez Hill) and nearly four feet deep. I rode in a row boat with two other from Long Beach

to Wilmington and returned for provisions, and the water was from a foot of so to three and one-hadf feet deep." The Supervisors said "Come on, men, we waste our time here. The meeting is adjourned."

And so Mr. Saunders says he does not see how they can confine the immense floods that come down from the mountains in a small narrow channel. Ordinarily it is all right, but when the great floods come, that is different.

The vast amount of sand and other material brought down into the valley comes from the lands that are being washed away when the channel changes about from place to place, by each succeeding flood. Of course some of it comes from the mountains, but the greater portions come from the lands washed away.

Mr. Saunders well remembers the incident told by Mr. Casebon about Booth Wardlow and his apple orchard, house, and wall being washed away.

If the floods are confined to a channel from the mountains to the sea there will not be much sand to carry, but is there enough velocity to carry the sand? Why did Coyote Creek fill up so much under the bridge on the Anaheim road? It looks like a big problem.

Water is the life of this country. Dry farming does not amount to much. But, if these flood waters, or some of them be conserved by building dams in the streams, or otherwise, then a great service will be rendered.

Mr. Saunders was approached by some real estate men to subscribe to a small amount of stock in a proposition to subdivide some of the lands, he had formerly owned in the valley. They wanted to use his name as a pioneer to refer to regarding the floods. He would not consent to that told them the land would be flooded. They said no, but the following winter, 1913, and last winter the land was all flooded. In fact, up to two feet of silt and sand was deposited over the land.

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90

Mr. J. A. Teel, 806 E. 7th St., Long Beach

Mr. Teel was seen at the office of the Board of Public Works on the afternoon of August 26th by F. Z. Lee. Mr. Teel came to this section of the country in 1878 and settled in what is known as the Los Cerritos Colony. He has seen many big floods and the first was that of 1881-2. This flood covered the country with water from San Pedro to Compton and Clearwater, but did little damage other than flood the land.

In 1884 there was a big flood, the principal part of which began in the latter part of February and continued on into March. It rained about thirty days steadily. It washed out the railroad track and many bridges. The water stood on the ground for several months. There were floods in 1886-7 and again in 1889. This flood was a heavy one and did considerable damage washing out railroad track and

bridges. This flood overflowed the Laguna ranch from the Los Angeles river and later united with the San Gabriel. The flood of 1891 was almost as large as that of 1889.

Mr. Teel is of the opinion that the world should be started as soon as possible--a big wide channel 300 to 400 feet wide with good banks on each side to confine the water. The floods, if put in Alamitos Bay, would do a great deal of good to the lands over there. It would fill up on this alkali land making it valuable.

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91
Mrs. J. B. Proctor, 801 Gladis Ave.

Mrs. Proctor was seen at her home on Thursday afternoon, August 27th, by F. Z. Lee. She came to Compton in 1869, when a little girl, with her parents from El Monte. In those days all the country around Compton was covered with willows, tullies and other small vegetation. There was many lakes and lagoons all over the valley, and at the time they came down there, it was necessary to go away around to the west to avoid a large lake and marsh. She has seen water all over Compton and her brothers have rowed in boats all around the streets of Compton. There was a large lagoon north of Compton along where the P. E. R. R. now has its tracks.

Their place, about a mile east of Compton, was cut in two by the floods last winter. Their land is lying idle now, not being fit for anything. They will welcome anything done with the river to control it during floods. They had never been damaged before last winter, although they had been flooded. The San Gabriel river has put a channel through the middle of their land.

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92
Uncle Billy Clark, 749 W. 6th St., Long Beach

Mr. Clark was seen at his home on Friday morning, August 28, 1914 by F. Z. Lee. Mr. Clark has been around Los Angeles and Long Beach since 1878 and in many ways has had occasion to note the floods.

The first flood that he remembers was that of 1881-2. Again in 1884 there was another flood, and the largest he has ever seen. From Los Angeles to San Pedro and as far east as Westminister, there was a lake or sea of water. A great deal of damage was done the farmers, washing away their crops, houses and land. One of the heaviest losers was the Nadeau Vineyard. The vineyard was badly washed, carrying away great numbers of vines and cutting the land up with washes and channels. Almost everything that was movable and many that weren't were moved by the water. Houses, barns, fences, warehouses, and the great casks empty and full, were carried away, some to the sea, some buried in the sands and some destroyed. It ruined Mr. Nadeau. This rain was almost continuous for three or four weeks.

Long Beach or Los Cerritos was a complete island, water being from San Pedro to Compton, Clearwater and eastward to Westminister and southward to the ocean.

Up to that time quite a good deal of shipping was carried on at Anaheim Landing. There was quite a little settlement there at that time. Vessels came into the harbor and discharged and took on their cargoes. However, since that time little has been done there in the way of shipping. The harbor filled up and has never been opened up again.

The Santa Ana River broke over into Coyote Creek and the flood waters came into the Alamitos Bay. In fact, the waters of the Los Angeles, Rio Hondo, San Gabriel, Coyote Creek and Santa Ana rivers were all joined together in one vast sheet of water. The country was impassable for several weeks.

Los Cerritos and surrounding country was a great stock and sheep range. It was necessary to get the sheep out of the low lands for they would lie down and drown. Mr. Clark, with Fred Bixby, Deafy, a vaquero and some others went into the flats east of Long Beach and got those sheep out. Reaching the San Gabriel it was necessary to swim across the stream to the slightly higher ground beyond. The water was very swift and dangerous. They went over alone, that is, without horses, but came back on horses, and had just as difficult a time getting back as going over. A portion of the lands around Alamitos Bay is part sand and very fine for raising celery. There is a large portion, however, which is alkaline and will not grow very much. This land east of Los Cerritos is known as the Artesian Belt and once had many springs scattered over the land. Now they had disappeared for the wells along the foothills have lowered the water plane until now the water does not flow any more.

The lands around New port and Anaheim Landing were once known as state lands. Squatters began to settle on the land and John Bixby tried to make them get off, but he could not do it. There was a large spring just south of where the Los Alamitos ranch house now is and this was stopped or covered up, to try to make the people move, but it did not work very effectively, and in a short time Mr. Bixby went up and uncovered the springs and told the people to help themselves. He saw Uncle Billy a few days afterward and told him he could not treat the people that way. Finally, however, when Mr. S. W. Hellman became interested, he got the squatters of all along the bay. When John Bixby died the land was apportioned off to the various owners.

These flood waters should be kept out of the harbors. Long Beach, although not generally known is choked up and filled up badly. They are not going to start dredging the channel out again, and the jetties extended out a quarter of a mile further into the ocean. Bonds have been voted for $624,000 for this purpose and with the hope that the U. S. government will help later on to carry on the work. This was practically promised by the Board of Government Engineers last week on their visit to this point.

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94
Mr. Joseph Mesmer, 200 Franklin St.

Mr. Mesmer was seen at his office at the Jeffersonian late this afternoon, September 8th by F. Z. Lee. He has lived in Los Angeles since 1859 and from the nature of his father's business which was that of a baker, and his connection with it delivering bread all over the "pueblo" at that time, many things are very vivid to him.

The first flood in Mr. Mesmer's time was that of 1861-2. This flood did little damage, but was remembered for the large amount of water that fell. The next flood and the largest of all, but not the most distinctive, was that of 1862-3.

During this winter there was a period of incessant rain, and on only one or two occasions was the sun seen and that for only a time. The wet weather became so monotonous that on one occasion about a dozen men ran about town started out on a jamboree to drive "dull care away" by going about from hotel to hotel and from bar to bar, drinking and creating what fun they could.

It was Mr. Mesmer's duty to deliver bread about town and one point of delivery was where the Old Occidental College Buildings now stand. There was a regiment of soldiers stationed there, who took bread from him. Going up there every day he had occasion to notice the river. The river narrowed up near the Pasadena St. bridge and near this point the water was very deep. Below this the waters began to spread and get along Aliso St. from Main to the east bank of the river it was all under water and impassable. True, there were places where the water was not so deep, and even points where land came up through the water as at Wilhelm and Aliso Streets.

The river had no defined channel. It would spread out over the valley and sometimes the wash would be on first one side of the valley and then on the other. There was a growth of willow and other swampy vegetation which greatly impeded the flow of the water and prevented erosion. There was nothing to cause washes. The stream was not confined but flowed where it would. There was little to damage and then it only overflowed.

There was probably now over 2,000 acres of land in cultivation in all the country about Los Angeles, and probably not more than 4000 acres in Los Angeles County at that time which included Anaheim where a German settlement had been started.

There was a well-defined bank between Main and Los Angeles Sts., from sixteen to eighteen feet high as far south as 7th street. There it began to diminish. There was a well defined channel 15 to 20 feet wide and six to eight feet deep passing about the intersection of 9th and Hope Sts., in a southwesterly direction out towards Exposition Park and into the Cienega. The Cienega drains into the Ballona.

It is certain that the Los Angeles river has flowed into Ballona Bay, and perhaps 150 years ago it did not go elsehwere. And in later years it has periodically broken away from its old course. From the indications of the soil it is perfectly evident that it has been no long period ago.

Just the other day, when the historical palm that stood in front of the Arcade Depot and was transplanted in Exposition Park, the excavation showed that only a couple of feet down exposed pure river sand and some gravel. There are many places where it only takes a foot or so to expose the old river sand and gravel. This old channel can be readily traces by a little exploration.

The sand and gravel pits in Exposition Park, the sand pit now open at Washington and Figueroa, the excavation for the annex to the Brugerhoff Building, 6th and Los Angeles Sts., all show the character of the subsoil.

The difference of elevation between the Arcade Station and St. Vincent's College is 75 feet which slows the natural slope of the country. It is only natural that the water should flow out through the southwest and the floods might cause the river to do that again, unless protection is made against it.

He has seen three or four feet of water flowing out through the southwest into the Cienega which was a great lake or inland sea. This water flowed into Ballona Bay--its natural outlet.

This is the natural course for a great canal for Los Angeles when they are ready to dig it. This canal could be extended nearly to Exposition Park, for many milesback from Ballona the land is not much above sea level.

Mr. Mesmer has owned land adjacent to Ballona and has seen the sale water back into the lagoons and estuaries at least five miles from the beach. This was during high tides.

In times gone by there have been some high winds in Los Angeles so strong that he dared not go across the street. He has seen large gravel blown along the street and was told some almost as big as eggs were blown by the winds. The buildings probably break the force of the wind on the streets now.

The floods of 1884 were very great and destructive. This flood swept away every bridge across the river except one, the old covered bridge at Aliso St. A great deal of damage was done to settlers and business in the lowlands along the river as all of this was overflowed. Many lives were lost and many houses washed away.

Mr. Mesmer aided many people out of the flooded district, and at Alameda St. he remembers the water was half way up to his thighs for he was wearing hip ribber boots and was concerned that he did not get in over the tops of them.

The Los Angeles river changed its course this year and washed away several hundred acres of vineyards, orchards and fields. The valley between Main St. and Boyle Heights was a solid sheet of water. This flood was very destructive but not so much as that of last winter. Conditions make a great deal of difference.

In the early times the lands were not cultivated. The only hard or packed land was where cattle had traveled. This would pack the ground so that the water would not go into the ground as readily. The land was covered with brush, bushes, trees and grass and held up the water to a great extent and too, the land was porous and took up a great deal of water. This made a tremendous difference in the amount of water that ran off.

In these days, there are so many paved roads and streets, railways and ditches that affect the flow of the water, preventing it from being absorbed and changing its direction of flow, that it has become a serious problem. It is becoming more important too as property is becoming more valuable.

In the city many improvements are being made to take care of the storm water, but in one instance the city engineers are making a mistake, for instance, in the big six foot storm drain on West Temple and southwesterly. They are not taking any precautions as to where this water is going. When this big pipe fills with water and combines with the great fall it has, it is going to do immense damage in the southwest. It will act like a sluice and cut the land up badly. This is a mistake, and is not right to turn this water onto unprotected people in the lowlands. It will flood them out.

The Arroyo Seco carried a great deal of water last winter, more than Mr. Mesmer has ever seen before. It had only a small channel and had never damaged anything with its floods. It began cutting in the first flood--1913--and the park commission saw what it was doing and had ample time to protect against any washing. At that time it carried away two or three of the finest speciments of Sycamore trees in Southern Calif. Last winter the floods carried away five or six more of these invaluable sycamore trees, and he holds the park commission personally responsible for this neglect.

Mr. Mesmer said that if he had one of those trees in his yard, one thousand dollars would not touch it.

This could have been avoided had some proper action been taken by the park commission.

There is ample river channel here in Los Angeles to carry the water, provided the bankds are protected. The channel could be narrowed if made deeper. He thinks the work should be done, and that as soon as possible. He is ready to stand his share of the expense or taxes and urges that it be carried forward.

If there is any possibility of conserving the flood waters, this should be done. The water is a great asset. Official channels should be established and proper protection made.

Mr. Mesmer says his memory of early times is much brighter, than of recent times, owing to incidents and facts coming into his life that made them indelible. There were in those days fewer things than now, when they crowd together so fast.

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99
Mr. H. Brooks, Lankersheim, on Central Ave., one mile east.

Mr. Brooks was seen in Los Angeles this morning, Sept. 10, by F. Z. Lee. He has lived in the San Fernando valley seven years, but prior to that time he has lived about Los Angeles.

Mr. Brooks lived about a mile east of Lankersheim on Central Avenue and has had ample opportunity to observe some of the floods of the past few years. There have been three floods which have done damage to property adjoining and in the vicinity of his. There is no protection against any one of the several branches of the Tujungas or the Pacoima going anywhere they may get started to going. They spread over considerable area and do not seem to go in the same place twice. When they do wash out land they take all of the good soil off the surface and leave a bed of sand and gravel which will not grow anything.

There does not seem to be any bottom to the gravel and sand beds as was shown by several "battleship" ballast cars at the Sherman Rock Crushing Plant last winter. The water began to wash the sand and gravel out from under the track until the cars tipped over and then the process continued until only a corner of a car could be seen a foot or so above the ground. The same was true of a steam shovel at the same plant. The shovel kept going down until only a foot or two of the smoke stack appeared above the surface. An electric shovel was also buried and the damage was very great--said to be $10,000--to the electrical parts of the machine.

This work should be begun as soon as possible and carried on until completed. It should begin at the mouth of the canon or further up if necessary, and constructed in such a manner that it would effectively confine the water to the channel provided for it. He does not believe that the gravel banks cleaned out from the channel will do it.

The water seems to do a great deal of work under the current. Makes a great hole and undermines almost everything, and then any structure crumbles and is destroyed. Just as it let in the ballast cars and the steam shovel--for this reason rip rap will not do.

There is no doubt but the Paicoima once flowed southeasterly near the county rock crusher. The old channels show that and the fall of the land indicates the same thing.

Most of the sand and silt that reached San Pedro Harbor came from the lands that have been washed away. Of course, every rain brings down a little sand and other material but comes only a little ways--then backs up. Then when the floods come, this accumulation is carried down and added to the great mass that covers some lands somewhere in the overflowed district.

But protection is badly needed, and now.

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100
Mr. John Rey, 423 S. Los Angeles St.

Mr. Rey was seen at his place of business, 423 S. Los Angeles Street this morning, September 10, 1914 by F. Z. Lee. He has seen some of the big floods but has not been a close observer. However, in 1889 he saw a street car floating down Alameda St. The water flowed out beyond the southwest into the Cienega. He owned 20 acres beyond Exposition Park and has been flooded several times. He has seen Compton under water, in fact, all of the low country between Los Angeles and San Pedro Harbor.

The old Los Angeles River once flowed along Los Angeles St. he has been told, but perhaps 100 years ago.

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101
Wm. Harper, 424 E. 6th Street, Long Beach

Mr. Harper was seen at his home this morning, October 25th, 1914, by F. Z. Lee. He says:

I have been living in Long Beach only about a year, having sold out my place about three miles west of Downey last year. I had lived there since 1868.

We have had many floods, and some of them have just about cleaned me out. Just after the flood of 1870 I sold 70 head of cattle for ten dollars per head, because I did not have the feed to take care of them. The floods had swept my crops away, and I could not see my stock starve.

In these floods I have seen about everything that could be moved carried away. Whole stacks of hay, fields of pumpkins, fences, chicken houses, and implements. Besides this the farm animals were carried away, and in many instances whole fields ruined.

Many of my neighbors left ruined, and it looked as if I would have to abandon my place too. I managed to make a living, however, and stuck.

The S. P. R. R. built their line across the valley, and at the time of the surveys, and also during construction, the engineers were told that the San Gabriel river carried a great deal of water, but they knew all about it; but when the floods came and washed out long stretches of their track at different times, they finally built their line higher. The water backed up from their embankment up to my place, and finally broke over their track. Another thing, they did not allow enough waterway, their bridges were not long nor high enough.

It is a hard matter to say how much of a channel would be necessary to carry all of the water. It looks fairly reasonable to confine the Los Angeles river to itself, the San Gabriel by itself; but when it is proposed to put them together, that is something hard to say. Now in the San Gabriel river on the east side of my place, two or three years ago, they had a channel 300 feet wide between rows

of piling, and when it floods came it did not amount to shucks. The water scoured out around those piles, and the barb wire did not do any good. The water got in behind every time and practically all the money spent was thrown away. It cost me $3,177.00 and it did me no good at all that I could see,

They assessed my land from the Los Angeles river, which was on one side, to the San Gabriel which was on the other side, which I do not think was right. They did not tax Downey one cent for the work, when the probabilities were that the river might go over their way as to go anywhere else.

In freighting over the country in the early days, the water used to go everywhere. The water spread out and at times was impassable for long periods.

During the early sixties in the civil war the government built a flume and a ditch from the Drum Barracks up to the valley to get a water supply for the troops and for town. Altogether it was about 18 miles long, seven of which were of wood. This was on the lower end of the line. They took out water as far as Los Nietos. The ditch ran down through Compton and at this point was joined by a ditch from a spring north of Compton. Every source of water supply was tapped, and even then when it reached the flume it never amounted to anything. The flume looked badly, and it was necessary to guard it with soldiers. General Manning built part of it by contract.

He completed the work, had the officers and soldiers on the ground to see the water flowing into the ditches and flume, got his papers for payment, and then started out to San Francisco to collect the money. The whole thing never amounted to anything. It was not long before a great deal of the flume was being used by the people to build houses, fences, and other utilities.

We had plenty of water where we were and had to go down about 300 feet to get an abundant supply. The source of this underground water comes from the mountains. The flood does not affect the wells any. The surface water does not penetrate to amount to anything.

There is much more water now than in other days. People did not know of the underground water, and it seems to be that the supply has increased as the country has been settled up.

Now that the country is settled up so much, and land getting so valuable, something should be done to protect the farmers against the floods, although I do not see how they can do it as the engineers seem to be planning. But after trying for a few years they will learn what is the most effective and most permanent work to put in. Everybody should help on that.

These floods have carried immense quantities of sand, gravel and silt. The country has been made that way. The sand and silt has filled up the low places and covered up the alkali, and in many ways enriched the land.

Of course, where the sand has been deposited it will not raise anything, scarcely for a year or so, but soon the sand rots

and then the land will grow big crops of anything.

Oh my place the floods have brought down material every year, and in my time I am sure there has been deposited from one to twenty-five feet of material on my land. Of course, some of the places were low, but it kept leveling off, and filling up at every flood.

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104
Mr. Wm. L. Crain, 1945½ Estrella Ave., Los Angeles, Calif.

Mr. Crain was seen this morning, October 28th, 1914, by F. Z. Lee, at his home. He says:

I came to Los Angeles in 1858 with my parents. The first big flood we had was that of 1861. There were immense quantities of water fell, and for perhaps forty days there was incessant rain. It did not matter where a person was, or what kindof soil he was on, everything got soft. An idea may be had when I tell you that when my folks were moving from Los Angeles to Tulare, we were caught in the rain in the mountains above Newhall on a ride which we considered safe. The rain did not let up and we were unable to get out. The soil became so soft that the wagon wheels settled down in the mud to the axles. After we had been there about aweek some Mexicans saw us and two of them swam the river, and came over to see us. Learning that we were about out of provisions, for we were out of almost everything except corn for the stock, they went back to their ranch, killed and dixed a beef and brought us part of it. We were unable to get away for six weeks, and these Mexicans kept us supplied with provisions while we were there. My father could speak the language fluently, else it might have been different.

There was water everywhere from this flood, and it is perhaps the greatest flood in the history of the Americans in California.

The next great flood was 1868. I was living at Wilmington at that time, and saw the immense amount of water there was in the valley between the hills at Wilmington and Long Beach. It was one solid sheet of water, and was so for several days. At this time the floods broke over into Nigger Slough and swelled its size to an immense body of water. It extended from where the county road, just west of the railroad track, over to near Redondo and Gardena. This lake lasted for a great many years, and there was no more water run into it until 1884.

The next great flood was that of 1884, and it ranks with that of 1868 in next to size. There was an immense amount of rain fell, and again the valley was covered from Wilmington to Long Beach. That flood washed out considerable railroad track at that time, and cut off communications for some time. The S. P. tracks were washed out in the Boledad Canon, and they had to completely rebuild the line through the Canon.

Again in 1889 there were heavy floods. The S. P. tracks were washed out very badly. Between Los Angeles and San Pedro the road was out of business for about a week owing to the track being washed

out between Dominguez Hill and Wilmington. More damage was done by each succeeding flood for the reason that more improvements have been made after each decade, you might say, and at the present time every one feels the effects of the floods of last winter more than all the rest of them. Land is becoming so much more valuable, and improvements are so much more valuable and numerous that something must be done. The people are ready and anxious to see the property protected against the destructive effects of these floods.

In the early days there was only one harbor in the San Pedro district, and that was San Pedro. Now they have two, and it is surprising the amount of improvements that have been made at Long Beach, and how effective what has been done there has become.

I was at San Pedro when the S. P. R. R. was fighting that place in every way they could and doing everything in their power for Santa Monica. They used the argument of the floods continually filling in the harbor with the U. S. engineers but it did not winout.

Now if the engineers can throw all of the water from the Los Angeles and San Gabriel rivers into Los Alamitos Bay, they will solve the problem of San Pedro Harbor and Long Beach as well.

For awhile the U.S. Engineers wanted to form a channel between San Pedro and Long Beach for the outlet of the flood waters, but that has been practically beaten now. The two harbors will eventually be connected up and made practically one.

The control of the floods is a vital question to every one, and in these plans every advantage should be taken of the possibilities of building dams for storage purposes. It seems to me that dams should be placed at points in the canons where they will afford any reasonable amount of storage water. In the Big and Little Tujunga, Poicoima, Arroyo Seco and the San Gabriel there must be locations which would be worth while to construct dams.

Should a large amount of the water go into the ground it will help the underground supply. There is a vast amount of water pumped out of wells, perhaps a great deal more than comes down the rivers in floods. Of course, the greater part of the underground supply comes from farther back than the little watershed of the Los Angeles and San Gabriel rivers. We do not know where all of the water from the great territory between the Sierra Madre and the Rockies goes. That was a questions raised back in the seventies and investigated by scientists sent out by the U. S. Government.

During the Civil War there were stationed quite a few soldiers at the Drum Barracks, San Pedro, and it became necessary to develop a water supply for the town and the Barracks. A scheme to bring the water from the San Gabriel and the Los Angeles rivers was planned and carried out. A flume was built across from Wilmington to Dominguez hill and a ditch carried on up toward Compton, and easterly toward the San Gabriel river. It was built but never used. Water was turned into it, but it leaked and was generally unsatisfactory and was abandoned in perhaps a week. Parts of it stood for some time but was finally torn down. The old ditch on the side of the hill at Dominguez can still be seen. In the main, it was only a scheme to defraud the government.

Years ago, when I was a young man, I used to talk to the old people, both Americans and Mexicans. They interested me more than the young people. The Mexicans have told me many times, and it is a sort of legend among them, that in the early days the Los Angeles river ran out through the southwestern part of the city, and emptied into the Ballona Bay. It is entirely feasable physically, and what has been may come again.

If we should have such floods as have visited this section of the country, and there is no reason why they would not, there would be vast damages done by floods. Even a flood like that of 1891 would do untold damage.

Then it is very important that everything be done to afford all protection possible. The people want it, and the country is rich enough to afford it. It will create a great deal of confidence, and result in greater improvement and progress than ever before.

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108

Mr. F. Z. Vejar, N. Pomona, Calif.

Mr. Vegar was seen by F. Z. Lee at his home this p. m. Oct. 29th, 1914. He says:

I was born in Los Angeles in 1830 and came to this locality with my parents when ten years old, and have lived here ever since. Until comparatively late years I followed the stock business and knew the country east and south of here, but have never paid much attention to the country between here and Los Angeles, other than the trips we used to make in there.

My parents and old people of those days used to tell of the Los Angeles river flowing out through the Ballona Bay. They told me in 1825 there was a tremendous flood, and that the water extended from bank to bank in the Los Angeles river, and at that time, the river flowed just below the hill where the old church now stands.

During this flood the river changed its course and ran out by the Dominguez place.

In 1856 there was another big flood, but not so big as that of 1862. In 1862 I was moving some cattle from the Mojave into my ranch here, but the ground was so very soft from the rain that it was almost impossible to get along.

In 1867 the San Gabriel river cut out what is known as New River. Before that time the river had always run west of El Monte.

We are now having trouble with Pomona. They are going to divert the water to the west of the ridge, just above my place here, which has always flowed to the east. That year some of the water went east and some west. The arroyo split, and now they are attempting to throw all of the water to the west, and that will cut up my land badly. I do not think it is right. I have paid assessments and taxes upon these improvements, for the benefit of Pomona, and

they will be a menace to me, in fact it will cut up my land and ruin a portion of it.

(Mr. Vejar has many stories of the early days, during the Mexican rule and later that of the U. S. but they in no way bear upon the subject)

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109

Mr. W. W. Cottle, 615 Canon Drive, Beverly

Mr. Cottle was seen by F. Z. Lee at his home this morning, October 30th, 1914. He says:

I was raised on this side of the river and have lived at either Pico Heights, Hollywood or Beverly since 1867. I am not, therefore, familiar with the actual overflow and flood of the Los Angeles and San Gabriel rivers. I have seen their work, and I have known of the rivers in a general way all of my life, but we have never had anything to do with them. We have never been troubled with floods here.

Once in a while heavy rains come and some water would come down from the hills, but it did not flood us out. I have always noticed that after we have had a fire on the hills and when everything was burned off pretty clean, that we always got more flood water than at other times, no matter whether there was a heavy rain in the hills or not. There was nothing to check the run-off of the water when the rain came.

If the sides of the hills are covered with brush and grass it checks the flow of the water from the steep sides of the hills and more goes into the ground. The papers have been talking about the plans to build dams in the mountains to catch the flood water, but I do not see how it is going to be very effective. Any dams that may be built will soon fill up with sand and gravel. The water could not get much of a check by merely running over a dam whose reservoir capacity is filled with sand and gravel.

The streams would not be very hard to control except at the extremely big floods, if they would have an official channel then keep the banks lines with willows and the channel clean. A straight channel will permit the water to run off without so much danger of cutting out somewhere.

It is something that should be done, however, for the farmers need protection. Some people think that the old San Gabriel river used to run west of El Monte before it split. That is not correct, however, for this was cut out in later years.

When the Aqueduct water has been used for a little while in the San Fernando Valley for irrigation purposes, it is going to make a lot of difference in the underground water level. I have been this my ranch in Tulare. Before they began irrigation in there it was out an average of 20 feet of water in the wells, and now they can

get water at about 7 feet. If it was not for the gophers it would not be necessary to irrigate Alfalfa, but they use the water principally to drown out the gopher.

111
Mr. Eli Graves, 427 E. 6th St. Long Beach

Mr. Graves was seen at his home by F. Z. Lee this afternoon October 26th, 1914. Mr. Graves bought a place about a mile from Clearwater in 1883, and has had one great experience with the floods, that of 1884. He says:

I attempted to settle on land that would not be overflowed and bought a place about a mile east of Clearwater; that was in 1883. On the 17th of February, 1884, our troubles began. The water came up and was everywhere. My place was completely inundated. Chickens, cow, horses, hogs and everything loose was on the move. We did not know when the water would get higher and wash away our fences and buildings. Hay stacks and all crops in the fields were carried out to sea. It was impossible to have gotten away, for we were surrounded by deeper water than was on our place. At one time we thought of going to a neighbor's place, which seemed higher than ours, but we soon learned that we were as well, or better off, than they were.

The water had immense force, and did great damage by washing. In the stream great cottonwood trees up to two feet in diameter were twisted and broken as they were caught against the bank by the current.

The water would get started in a whirl against some obstruction and scoop out a big hole, perhaps 100 feet wide and six to eight feet deep in a short time. The water would get started in a whirl against the roots of a tree and it would soon be uprooted. It seemed that some obstruction of that kind was play for the water to uproot. I had a cousin who had no idea of the force or extent of these floods, and who thought I was timid when the water came and marooned us. He thought differently and undertook to swim his horse against the stream. He was unable to extricate himself from the flood and was mighty glad to get someone to pull him and his horse out of the rushing waters. Another time, this same cousin had been looking about in his ramblings and picked up a pitchfork. He attempted to cross a branch of the stream which was about knee deep. He acknowledged that had he not used the pitchfork as a support it would have been impossible for him to have remained standing.

Judge Venable had a place just north of mine, which was low and swampy. His land was about half a mile square. Seemingly of little value at that time, it was set out to willows, cottonwoods and gum trees. It was intended exactly as a breakwater, although it was expected that it would help fill up the low places to some extent. However, when the floods did come, it proved to be very much of an obstruction. The floods were turned eastward and in turn completely washed out a man about a mile east of Mr. Graves' place.

There is not much difficulty in turning the water, but unless the water is confined to a certain channel, it is impossible to say where it will go. The great damage has been in washing away good

lands. As long as so much material is moved it would do but little good to provide a channel for the river, for it would soon fill up and the water would break away to another part of the valley. In fact, there seems so much water during one of those big floods that it is hard to conceive a channel big enough to carry it all.

It is true, of course, that the water was spread out over a large territory and that the velocity in some places was not so great as in other places. If the water was confined to a channel, it would no doubt scour out to some extent, and perhaps carry the water.

There are times however, when there are cloudbursts when it does not rain, it simply pours, and this is when the danger comes, for the floods seem irresistible.

The main thing in all embankments is that the foundations must be such that the water cannot get in behind or underneath and cut it out. As sure as any opportunity is left for the water to undermine the embankment of whatever character, just as surely it is doomed. The light soil melts away so easily and rapidly, that the only conceivable channel to me is one of heavy concrete sides and bottom. To put in embankments will hardly do for the water will get in under it in some way and undermine it. It is remarkable the amount of material that one flood will move. I was away from my place during one of the five floods that visited my own place. It was filled up from six to eighteen inches in depth with silt and sand. This occurs during every flood.

The first year after these floods scarcely nothing would grow on this land, but the following year the land would grow good crops of anything. It would greatly enrich the soil and greatly benefit the land, except, however, when the flood reversed the order of things and washed away the good soil and either, left or uncovered a bed of gravel or hard material.

These floods come every few years and no one could tell when they would come. The floods might not damage any certain locality and then they might. It was always uncertain.

There were a few wells but down near my place the deepest, at that time about three hundred feet deep. They afforded an abundance of good water and most of them were artesian. I have heard of the well drillers striking trees sometimes two feet thick in putting down wells.

The flood waters do not affect the wells as the supply, unless it is actually surface water, is too deep down and below impervious stratas of clay, which prevents the water from going down and also from coming up. It is there impervious stratas which make possible the artesian water.

This source of artesian water, and all of the underground flow for that matter is back in the mountains and even further back too. It has always been a mystery where all the water goes that comes from the Mojave river, the Truckee and others that sink into the sands or

crevices of the earth out in those big basins east and north of us.

The rains do not affect the supply. In fact when it would seem that when the dry weather comes on the supply of water would grow less. On the contrary the water rises in September and everyone has ample water. There is another thing I would like to understand. I have a brother who has a place in the Santa Cruz mountains and who has observed a lake on top of the mountains for the past twenty-five years. It is his forecaster as to wet and dry years, for invariably when a wet season is coming on in August and September, when the water in the lake should be the lowest, it is actually rising, and when the rainy season actually does come on it is practically full. It works just the reverse to the preceding dry years. The water will get lower and lower and will almost dry up during the dry year.

There is another case which acts similar to this, but the location is up in the San Joaquin Valley country. The drain ditches to a swampy piece of land proceding a wet year are full of clear water, and preceding a dry year the ditches dry up, and great cracks open up in the black soil. The people in that vicinity can always tell what the year will be--wet or dry.

I think that flood protection should be carried on and good, substantial work be done. The people demand it and would appreciate it. It should embrace every one in the county. No one would seriously object to being taxes for such work. The federal and state government should be heavily interested and should bear a large part of the expense--both are vitally interested in protecting San Pedro Harbor.

115

Mr. J. T. Cullen, Los Alamitos Water Plant, Long Beach

Mr. Cullen was seen at the pumping plant, this morning, Sept. 21st, 1914 by F. E. Lee.

He had lived in this section of the country for a great many years, and this experience with flood waters was when he was farming west of Willowsville, in the American Colony of 1884.

At that time the San Gabriel River was about where it now is, at the concrete bridge on Long Beach Boulevard, just north of Los Cerritos, about opposite the old adobe house on the hill it turned to the westward across the valley and went down the west side of the valley. In November and December the farmers in the American Colony were building a ditch to better carry this water from the river to their lands, as the similar ditches were inadequate. The headgates were over near the west side of the valley.

In February and March the rains set in, and there was little let up, if any for about thirty days. The country was well-saturated and the floods began to come down, and then their troubles began. The Headgates were taken out and a channel was formed along this ditch they had dug. It started the water, and that was all that was

necessary. It cut a channel across the land (diagonally) belonging to a man named Kincaid, very nearly ruining every big of it, for the strip was narrow. This flood covered the whole valley and broke into Nigger Slough.

The floods spread over the lands as a rule, and did little washing until just recently. This is due to the large amount of land under cultivation, and the more rapid runoff, but my experience has been entirely in the lower valley, and I could not say how much of a channel would be necessary. As an instance, there was water last winter from these tules just below the pump plant to the river, which is just this side of the Los Alamitos Sugar factory. There were places deep enough to swim a horse. This water did not stay on the ground but a very few days; it gradually drained off. On many places it left good deposits of sand and silt, and in other places left only a few inches. These floods are good for the land if they can be prevented from washing.

The surface water does not affect the artesian wells that can be noticed. The large number of wells that are being put down greatly affects the flow of water. An instance of this is in one of our best wells. It was put down nearly 1000 feet and flowed nearly 225 inches of water in response to a pressure of 25 pounds per square inch. Now it flows a good deal less than half that amount and has only a pressure of 12 pounds per square inch. All wells are not so greatly affected, but all are to some extent.

These wells go through stratas of sand and gravel. In two instances wood has been struck. In the big well a piece of pine was brought out as big as the pipe would permit, and although black, the grain was perfect. It was pine, and was found between 400 to 500 feet down. Near here another well gave up a perfect pine cone at about the same depth.

The thing that puzzles me is that if the channel of the San Gabriel river is put over here, what is going to become of the surfaced water. It will be behind the embankments, and must go out somewhere. There will probably be considerable opposition to the river being put into Los Alamitos Bay and if it will injure anyone they are not to blame for trying to protect their interests.

117

Mr. Fred H. Bixby, Los Alamitos Ranch

Mr. Bixby was seen at his ranch this forenoon, September 23rd, 1914, by F. Z. Lee. He was willing to talk the matter of river control over although the plans which he understands are under way are detrimental to his interests.

The plan which he speaks of is forming a channel 1000 feet wide for the San Gabriel river, and also a channel for the Los Angeles river from the proposed levee to be built from Dominguez Hill to Los Cerritos, leading the water to a junction with the San Gabriel at the point of the hill where the Fred Bixby house now stands. This

takes two strips of land diagonally across his land and that of his sister, 1000 feet wide, forming a V at the point of the hill. This cuts their land into three pieces, which greatly affects the galue of the ranch by making independent bodies of land of it, besides the great strips taken away for river channels.

This land is already suffering from flood conditions from the New San Gabriel river. A district was formed above us, the land was assessed, and the district was stopped at the point of the hill just below the ranch house. No channel was provided for to carry away the flood waters below our place. The consequence is that the old channel has filled up 12 or 15 feet, making it impossible to drain the water off, and every year the floods bring down sand and silt, filling up the lowlands. The material that is deposited now is coarse sand, which will not grow anything for several years. The silt is carried on out to the sea.

We would be satisfied if things were as they used to be. Before the small protection districts were formed the floods came down leaving the boulders up near the mouth of the canons, the gravel was deposited further up, as was the sand, but the silt was deposited on the lands, making them richer. In fact, it has converted the old alkali land into good land by depositing three or four feet of silt all over it. But now the water carries the boulders further down, and the sand is brought down and dumped on our land, and the silt carried out to sea.

This flood water confined to a channel is going to build up and it will be impossible to keep the water in the channels. When it breaks over the banks it will simply do more damage than than before.

The channel the New River protection district decided upon was 300 feet wide, and I believe big enough. The water cut only a small channel last winter, of say about thirty feet wide. The water was not carried to the sea, but left here at the point of the hill near the lower edge of our place, where it spread out and swamped everything. There was a sheet of water perhaps two miles wide by 10 or 12 feet long along the river last winter. It greatly set us back in seed planting time.

The artesian wells are not affected by the floods or surface water. Our wells are nearly 1000 feet down, and are not affected by dry years either. Wells that are only 300 feet deep are affected by the time of the year and by dry years. The source of our wells is high up in the mountains, while the shallow wells have their sources in the foothills. This he shows by illustration:

The water travels along the clay or impervious strata, and naturally the further back the strata goes the greater the supply, and the less it affects anyone or anything.

Finally Mr. Bixby says he would have no serious objection to the water coming into Los Alamitos Bay if they pay a satisfactory price of his land, which he values at $750 per acre, since he can and does get a revenue of $100 per acre per year for the land set to alfalfa. This gives him interest at 10% and further if protection is given him against the floods from the rivers.

While he would much rather not have the river turned over through his land, and says he would vigorously oppose the move, still if he is assured that he will equitably remunerated for the land taken over for the official river channel, and that there will be no menace from floods everything can be adjusted.

He does not see how the Huntington interests at Maple can stand by and see the system of drainage carried out down there be filled up by the floods, which they surely will be. Mr. Huntington probably spent $1,000,000 in reclaiming the lands around Newport.

When asked if the silt and sand deposits could not be profitably used by turning the flood-covered areas protected by levees, thus filling in and making new land which is now of no practical value, he thought such a thing could be done. He was filling insome of the land every year by diverting the water to sections he wished to cover. Only a few days ago he directed his foreman where to put in a wing dam to divert the floods for the winter. It fills in low places and fills up cuts.

He understands his cousin George H. Bixby was very much in favor of the Los Angeles river being thrown into Los Alamitos, because it would go over some of his land which is absolutely no good.

When the proposition of protection began to be agitated, and the government engineers wanted to throw the water into Los Alamits Bay, Mr. Bixby talked to Mr. Omstead about the right to throw the water from one water shed to another, Mr. Omstead told him it could not be done, and that he would fight it to the last. Only a short time ago he heard that Mr. Omstead had turned completely around and voted with the rest of the engineers to put the water into Los Alamitos. He said he could not understand that, as when Mr. Omstead told him he would oppose it with all his force, Mr. Bixby hired him to protect his interests.

Mr. Bixby was glad to furnish the log of three wells he had dug three or four years ago. The flow has been steady, and has not diminished since they were dug.

Log of well three miles east of Fred Bixby's ranch house; flows 100 miners inches;

1 to 12	soil
12 to 103	---clay
103 to 120	---sand
120 to 217	---clay
217 to 243	---sand
243 to 261	---fine gravel
261 to 301	---clay
301 to 335	---coarse gravel
335 to 360	---clay

Cut from 331 to 335 with 5/8 by 9 in. hole

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Log of well #3 (McClintock) four miles east of Fred Bixby's ranch house Flows 110 miners inches

1 to 20 ---soil
20 to 143---clay
143 to 153---gravel
153 to 173---clay
173 to 185---gravel
185 to 303---clay
305 to 357---sand
357 to 395---clay
395 to 448---gravel, boulders
448 to 455---clay
455 to 485---clay, sand
485 to 661---clay, mud
661 to 672---gravel, no flow
672 to 703---clay
703 to 723---sand
723 to 747---gravel, fine (no flow)
747 to 751---clay
751 to 775---gravel. fine (no flow)
775 to 798---sand
798 to 802---sand stone
802 to 828---sand
828 to 849---gravel, fine
849 to 861---clay
861 to 875---sand
875 to 913---gravel, coarse
913 to 921---clay

Cut from 913 to 875
Cut from 849 to 830

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Los of Well No. 4 (Russell and Stewart) two miles east of Fred Bixby's ranch house--flows 535 miners inches.

1 to 72---clay
72 to 115--sand
115 to 175--clay
175 to 179--gravel
179 to 227--sand
227 to 281--clay
281 to 284--gravel
284 to 299--sand
299 to 322--clay
322 to 355--sand
355 to 369--gravel
369 to 401--sand
401 to 445--clay
445 to 475--sea mud
475 to 481--gravel
481 to 585--fine sea sand
585 to 611--hard yellow clay
611 to 625--yellow sand and clay
641 to 644--sandstone, cement--Bottom of 12 inch pipe
644 to 703--clay
703 to 715--sand
715 to 749--clay

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Log of Well No. 4 (contd.)

749 to 756--sand
746 to 763--clay
763 to 781--sand and gravel
781 to 813--sand and gravel
813 to 841--gravel
841 to 925--gravel (sand)
925 to 975--gravel
975 to 1030-sea mud

Cut from 975 to 929
Cut from 841 to 821

122
Mr. Wm. N. Newland, 829 Title Insurance Bldg.

Mr. Newland was seen this forenoon, November 30th, 1914 by F. Z. Lee at his office in the Title Insurance Bldg. He says:

I was born on the Puente Ranch in the valley of the San Gabriel river, and have lived there all my life.

The first great floods of which I took note were those of 1861. A great deal of rain fell that year and caused big freshets in the San Gabriel river. The waters brought down immense quantities of big timber from the mountains. In fact, we did not know what pine was until the flood waters brought it down from the high mountains.

There was little, if any, farming, going on in those days.

Old Henry Dalton and Pio Pico were cultivating small patches of land but from lack of water they could do very little. There was nothing to damage as there was nothing in cultivation, and as there were practically no banks to the rivers, and when their beds were filled the waters would spread out over the country and go where the land would permit. The river really never carried much water except during the rainy season. Then the flats would be covered by water, and the stream bed was filled with quicksand.

In the early days when the Mail stage crossed the river at El Monte during the rainy season, it was practically impassable, on account of quicksand, except when the sand was packed down by first driving a herd of wild horses across two or three times to settle the quicksand and make it passable for the stage, to follow in their train. The old buildings are still to be seen at a place called Thompson's Station, where the stage line crossed.

However, during the dry part of the year there was no water in the river. In those days the people only attempted to raise cattle, horses and sheep and relied upon the land for grazing only. It was very poor grazing land, too, for all of the valley was covered with cactus and brush and very little grass.

Down near the old Mission the water would come to the surface and this is where the stock got their water. The cattle would graze up the valley and about every other day would go down for water; it was too far for them to go every day. This drainage from the swamps above formed what is called Rio Hondo.

In the drouth of 1862-3 there was no water in the San Gabriel river for twelve to fifteen miles up the canyon. It was a practice with some of the people who lived near the mouth of the canyon to puts their cow in the wagon, together with what barrels they could haul, go up into the canyon, take the cow out of the wagon and let her drink and put her back into the wagon again, fill their barrels with water and return. There were many fights in those days over the water problem.

In the flood of 1868 the San Gabriel cut over to the westward just below where the confluence of the San Jose Creek and the San Gabriel river is. This is what is called "New River".

A short time after the flood of 1868, we began putting down wells for a supply of water, but our efforts were lost as we could not go down deep enough. In those days they did not have pipes and pumps as now, but had to haul the water up in a bucket on a rope, which was slow and laborious. These wells were dug by hand and too, as they did not have cribbing the maximum depth to which they could put a well was about 150 feet down, but in those days we could not go deep enough to get water.

For several years I was tax assessor of Los Angeles County. Many men have offered to deed their places over to me, saying that they could not pay the taxes, but I would tell them I did not want the land, that I know it was not worth anything. Now it is all very valuable.

It has been this development of water by modern methods that has made the land.

One particular incident that shows how little water there was in the river in those days. Mr. Workman had a small mill on his place that would crack about three sacks of grain a day. He was taking the water from the river, in fact, all of it. Below him lived old Gov. Pio Pico, who was trying to irrigate a small patch of land. Gov. Pico's ditch also led from the river, but Mr. Workman was getting all of the water, and turning it away from Gov. Pico. So Gov. Pico asked me to mention this to Mr. Workman. We were all on very friendly terms and did not think anything of it. So when Mr. Workman learned of this he said certainly and when the mill was not running he would send it all down to him.

There was only one change in the river as far as I know; that of 1868. In that year the water made quite a change in its course. It formed New River, leaving the old channel to Long Beach dry for several years. In about 1 876 the river began to flow to the west of El Monte a small amount.

This was caused by several farmers on the west side trying to turn the water over their way for irrigation purposes. There was some trouble about this for several years as it flooded some of the people below, and they in turn tried to turn the water back toward Bassett. It has gone on so long that there is a large amount of water going over to the west, perhaps as much as goes down the east branch of the river.

But the original bed of the San Gabriel River was down the Bassett way, and that is where the river should go. It is the most direct route, and if the water is kept in a channel until it reaches the old channel near Bassett, the channel there will carry the floods if the channel is cleaned out and the water given a chance to get away.

A bank six or eight feet high will be all that is necessary to hold the water from breaking to the west.

The lands lying south of El Monte and down to the old Mission was once water soaked, being a marsh in most part, with numerous lakes scattered about. These lakes were good-sized, too, and were there all the year round. The marshes were covered with willow trees, tules, water grass, blackberry vines, and much undergrowth common to swamps. On one considered the land of any value as it did not seem possible to cultivate it.

Some of the settlers around El Monte began to clear off small plats of land where it was not covered with water and put it in corn. They liked this business. It did not require irrigation, and would grow without much attention. All that some of these people wanted was corn to make hominy and some feed stuff.

In those big floods the water would practically close traffic by the way of the Monte. It was necessary to go around up by Azusa to get across the river, and even then only horseback riders could cross. Buggies or wagons could not get over.

It seems that more water fell in those days, for the rivers would run for days at a time with little let up. There has been no flood lately like those big floods in the earlier days. I cannot account for the difference in the flow of those floods, but am satisfied that such floods will come again and with greater destruction, than we have had if the river is not taken care of with ample channel and provision for big floods.

The floods used to come down to the east side of the valley near Azusa and to never branch off toward the west until people began to coax the water over that way.

126
Mr. J. R. Ramirez, 812 N. Broadway

Mr. Ramirez was seen this afternoon, Sept. 24, 1914, by F.Z. Lee at his home.

Mr. Ramirez was born in Los Angeles in 1839. His great, great grandfather came to Los Angeles in 1786, he thinks, and the descendants have lived on the old home place ever since. At the old home was made the first wine and brandy in Los Angeles.

In those early days up to 1825 the river flowed along San Fernando St., which is just below North Broadway at this point. In 1825 the floods were the greatest in the past 100 years. This flood filled the whole Los Angeles river valley from the bank between North Broadway and San Fernando Sts., to the S. P. R. R. yards on the other side of the river. This flood changed the course of the Los Angeles river eastward from its old bank, along Main St., to somehwere near Alameda St. Its entire course was changed to the south side of the city. The river flowed out through the Ballona Creek before this flood, but after this time it passed near the foot of the hills at Dominguez, and into San Pedro bay.

There were other floods but none like that of 1825. There were big floods in 1832-42-49-52-59 and 62. The flood of 1862 was the largest since that of 1825.

In 1849 the river again changed its course from near Alameda St., further eastward to perhaps near its present location. It could change very easily anywhere for there were very low banks and there was nothing to keep the water from going anywhere. The land was all swampy from Los Angeles to the sea. In the San Fernando valley there was a great marsh where the Lankersheim ranch now is. There were few trees, some few Alamos and some willow.

Mr. Ramirez' grandfather's name was Abila and it was he who had a vineyard where the S. P. R.R.yards are now. They lived on the place he now has. Mr. Abila had a brick kiln back against the hill to the west of their place.

Mr. Ramirez once had a contract to do some excavation at 6th & Main Sts. He did not anticipate that he would encounter boulders two and three feet in diameter, and lost some money as it was although he was given some $300 to cover his contract. These boulders were smooth and well worn.

The Arroyo Seco emptied into the Los Angeles river where Downey Ave., now is, and has been gradually filling up and dropping back to its present location at the pigeon farm.

Mr. Ramirez made a trip from Los Angeles to the Imperial Valley with his father in 1849 to bring out a string of wagons that had been left down there because the mules of the wagon trains had been driven off by the Indians. On returning to Los Angeles they crossed the San Gabriel near Azusa, but was held up there for three weeks on account of the extreme high water.

When Ramirez was told that we were looking for data to enable the engineers to perfect their plans to control the river, he emphatically said it could not be done. Then he showed where the water had been in 1825, and said that there was not money enough to control such floods. These floods will come again, he said, and no one can keep them from it.

In the flood of 1849 the river cut a great wash where the Baker Iron Works now stands. In 1862 the floods almost broke over into the old channels where the river had formerly been. A few inches higher and the water would have been back in its old channel.

There used to be a number of springs near his place--one in the high river bank.

Mr. Ramirez was called away but offered any information that he could give.

128
Mr. H. A. Unruh, Arcadia, or 175 Trust & Savings Bldg.

Mr. Unruh was seen this afternoon, Sept. 25, 1914 at his office by F. Z. Lee.

He has had a great deal to do with the control of flood waters of the San Gabriel river for a great many years, and twenty years ago tried to get the Supervisors to take some action but was never successful. He is still fighting along the same lines and his aim now in consenting to become a candidate for Assemblyman for his district is to aid this work of flood protection.

He was the west branch of the San Gabriel river when it was a mere irrigation ditch, and now that there is considerable water passing that way many people think that that is the old San Gabriel river.

Most of these canons and arroys do not carry water except during the storm or rainy season. There has never been any effort made to control the stream as a whole and now when the floods come they do immense damage.

The duty and part of the engineering profession is to solve problems rather than to create them. The solution of this proposition is principally by catchment basins and by absorption of the water by spreading it over the five or six thousand acres of waste gravel beds at the mouth of these canons. This debris would take up an immense amount of water and finally become a benefit of all.

There are many places in all of these canons where small dams could be erected and at no great expense.

A simple problem in mind is the Santa Anita canon. It is a dry stream most of the year. There is a very suitable location for a dam near its mouth where the banks are, perhaps not more than 25 to 50 feet apart at the base. The rise of the Santa Anita is not so steep and a dam of say 125 to 150 feet high would back the water up say three-quarters of a mile.

Then in the east branch of the Santa Anita near its mouth another dam could be constructed. In the Puente Hills there are many locations where water could be conserved.

A very important case is now at hand. Arcadia has just voted $130,000 to develop water for the city. They propose to drill wells

and develop water in that way. They believe that the Pasadena basin extends eastward into their district, when in fact it stops on a ridge between them and Pasadena and there are doubts as to whether they will get the water.

Now what they could do with almost the same money would be to __ into those canons and construct dams to conserve the water, then pipe it out to the users. This would serve two puposes, conserving water and furnishing it.

So it could be done with all of these canons. Build dams to catch the water and from the reservoirs or dams build conduits to catch basins lower down in the hills and canons or the valleys, anywhere that there could be constructed a dam, economically, storing the water for users, municipal or agricultural.

There are hundreds of locations for small dams to catch the water coming out of those canons and as many more desirable locations for storing this water by conveying it from the dams to storage by consuits. The conduits could be calculated so as to be able to carry any of thes e floods.

There is much more water which comes down the San Gabriel river at times than at others and in the very highest floods at least 50% of the floods could be taken care of.

This has been demonstrated by us by building a small dam and when the rainy season came on the water was run out of the reservoir and when the floods came it merely filled it up again for the dry season.

What if the dams do fill up, although that will take years to complete, even then the material is porous, it is like a sponge and catches the water, it breaks the rush down the canons and lets the water run off slowly and under full control.

But the storage capacity will increase, for it will be built up and taken care of. The great gravel cones at the mouth of the canons will be made to take up a great deal of the surplus flood water, if any passes the dams by being spread out and allowed to go down into the gravel beds.

These dams will stop most of the debris going down the canons and will help that much towards keeping the channels of the streams from filling up and from filling in the harbors.

Should there be more water than could be stored, it could be estimated just what size channel would be necessary to carry it off. Then, if the channels were straight there would be no difficulty in conducting the water to the sea.

These channels should be built straight and kept clear of all obstructions. Each year before the rainy season all weeds and willows should be cut out. The floods should be watched and the channel patrolled to prevent any obstruction from choking the channel or from diverting the water towards a bank and thus cutting out.

A very important thing that should be taken in hand at once so as to be prepared for the rainy season when it comes is the proper observation of rainfall and the run-off of the various streams. This work could easily be carried on by the road department. The overseers could take raingage observations and also read stream gages. It is all important the engineers know what amount of water they must contend with.

This work should be pushed along and if it costs ten million dollars it will be cheap and if it costs one hundred million dollars it will be well worth it. Every citizen of Los Angeles County will benefit from it. It is not the ranch who is washed out and his land ruined who should pay for this--it benefits all. The Federal and State Government should pay the major portion and the county should have only about thirty per cent to pay.

This is a problem that Mr. Unruh has been studying for years. Engineers were engaged to make estimates for dams and other ideas for controlling and conserving the flood waters, and had Mr. Baldwin been able to carry out those plans at the time, a great deal of this would now be serving the community.

The Supervisors had this matter brought to their attention twenty years ago, but no action was ever taken.

The proposition of building dams is not altogether a theory or fancy. The first thing that attracted the attention of people to the dams was an incident fifteen years ago.

The Santa Anita canon had always been a dry stream up to that time. At this time, however, it was noticed that all through the dry season there was a fine little stream of water trickling down the Santa Anita Canon. To satisfy himself as to why, that water was coming down there when always before it had been dry, he set out to investigate. About fifteen miles up the canon he found there had been a big land slide in the canon and had partially dammed up the stream. Above the mass of debris was a fine little lake. The was seeping through the dam slowly and making a supply that had always run off before as it fell, extend through the dry season.

So it would be wherever dams were built. What if they do fill with boulders, gravel, and sand. It is well understood that there is from 35 to 55 percentage of voids in sand, gravel and boulders. Then there must be that percentage of water held anyway.

Most of the material in the mountains would be coarse stuff and for that reason would hold that much more water.

The following article was written several months ago and published in the _____ to arouse interest in this great project.

"CONSERVATION OF WATER THE SOLUTION OF PROTECTION FROM FLOOD DAMAGE"

A careful study of existing conditions shows that there is in all cases a reachable source of damages caused by flood waters both large and small, and the question is not so much, what a committee

of engineers can say about it, but instructions to such engineers as to what is wanted, and setting them to work, not to create problems, but to solve the problem.

In all instances, where there is a watershed area drained through canyons, from which in time of flood, damage arises, there is at the mouth of such canyons large areas of barren land suitable for catchment basins, which could be utilized by construction of dykes to hold back and control water so that it might be turned into as many different conduits as would conduct the water to places where it would be of benefit instread of injury; these conduits, some of them carrying a good deal of water, could be made to terminate in lower ranges of hills where there are immense basins and canyons capable of being utilized as catchment basins, some to convey the water to localities where there are natural depressions suitable for catchment basins, others to various places where large areas have been heretofore made barren by the uncontrolled floods, and still others conduits to the ocean. None of these catchments need by cemented to hold the seepage that would naturally go to subterranean reservoirs and which would retain from year to year and by degrees dispose of the water now going to waste during storm periods. These conduits could also be utilized carrying sediment along with the water to fill up and replace the lands heretofore washed away, and at the same time, prevent anything but clear water flowing to the harbor and protecting it from the menace now existing from the sediment emptying therein. Whole farms have been washed away and found their resting place in the harbor we think so much of.

This is a work that may seem enormous, but would probably cost much less than the Owens River project and would be of immense more benefit. The work can be done by the adoption of one general system, and when completed, would be the cap sheaf of perfection to our locality. It is a public matter, not one that can be handled by piecemeal methods. Every individual and corporation is vitally concerned whether or not they may be in the path of danger. The State and Federal Government should take a large part in the work and undoubtedly will do so. It is said that Secretary of the Interior, Lane, will urge Congress to authorize a bond issue of One Hundred Million Dollars for irrigation projects in several states. He has called a conference of Western Governors who are asked to discuss propositions for cooperation between the States and the Federal Government for building up irrigation and reclamation projects. Such projects would naturally insure to protection from flood damage. Many hundreds of thousands of dollars are appropriated annually by Congress on the condition that States and localities match those with an equal sum for improvements in waterways. Now is our time to get to work. Don't wait for another reminder such as this season's experience. Take up and perfect the providing of means to begin the work on a large scale and begin it. In the meantime, and before another season, consider whether or not the expenditures of a few thousand dollars could be made to lessen and possibly eliminate danger of a repetition of this year's damage. In the main canyons there are many places where dynamite could be made to fill in and dam up flood waters to an extent that would retard the flow sufficiently to prevent the ruh-off from coming all at one time. Nature has shown the possibilities of this in a certain canyon emptying into the San Gabriel Valley, which gathers the

water from a large area of watershed formerly emptyihg such water practically during the storm period, being perfectly dry at other times. A few years ago it was noticed that flood water from this canyon was greatly reduced and that the living stream was running the year through therefore. On investigating it was found that the side of the mountain had slid into the canyon and had backed up a large body of water which remained to run off gradually. A word to the wise ought to bring results.

We know that our Supervisors are in earnest and that they desire to accomplish results. Let them decide on prompt action on one comprehensive general plan and letting every individual get behind and push. Don't delay. The way to accomplish any desired end is to begin and keep doing.

134
Mr. J. Frank Burns, 4515 Burns Ave., Los Angeles

Mr. Burns was seen at Ball's Cigar Store this noon, Sept. 28, 1914 by F. Z. Lee. He came to this part of the country settling in the San Gabriel valley in February, 1853, where he lived until 1860 when he moved to Los Angeles. He has lived here ever since with the exception of five years when he was back east. The flood of 1884 came during this period, and he therefore did not see it.

A few years ago Mr. Burns was engaged by the Santa Fe R. R. to gather all the data he could get on the rivers and their floods for their defense in a lawsuit brought against the Company on account of a bridge which was said to have caused lands to be flooded during a rise in the rivers. This suit was brought by Arcadia D. de Baker.

Mr. Burns talked to all the old people of those days, one of whom was old man Pico, who was 93 years old at that time, but died eight or nine years ago. Another witness was 137 years old at that time. Both of these told him that the Los Angeles river up to 1825 flowed along the high bank just east of Main St. down to about 17th street and thence southwesterly into the Cienega and from there into the Ballona Creek and into Ballona Bay.

Col. J. J. Warner came here in 1831 and was marooned at San Pedro Harbor for three months before he could get out of the fence. Those two floods were undoubtedly the largest floods the country has ever had, in the memory of our people. There has been no floods since that time to equal them, but they will come again.

The largest flood in Mr. Burns' time was that of 1862. This flood did a great deal of damage to the few people who were cultivating the soil at that time. It carried away nine acres of land from Felipe Lugo's place, nearly rained Mr. Argullas' and Mr. Wolfskill's organge grove all of which was in the lowlands from Downey Ave. south to about 9th st.

The river needed to rise only a few inches and it would have gone back to its old channel along the west bank near Main St. The entire valley was a great lake or sea of water from Los Angeles to

the sea both towards San Pedro and Ballona. For three or four weeks it was impossible to get to San Pedro except around by Ballona, and then the water would swim a horse across the highest place. Just how any one would go about controlling such floods I do not know. It rained incessantly for about thirty days and even before the last heavy rains began the ground was saturated with water.

The next big flood that came was of 1868. That did not affect us so much as the flood of 1889. The 1868 flood caused the San Gabriel river to change its course. The San Gabriel once flowed where the town of Azusa now stands, that was in 1862. In 1868 the river changed more over to the eastward and broke out into what is called New River.

Lexington Wash was caused by an irrigation ditch, until now the people think that is the old river.

The flood of 1889 came on Christmas day when the greatest damage was done. Mr. Burns remembers this for he went down to help out and did not get away for three days and nights. This flood carried out bridges and washed away the railroads and immense damage to the whole country. The Los Angeles river changed to the eastward below the city limits, broke into the Laguna ranch and joined with the San Gabriel river. The whole country was covered with water.

They should build dams to hold the flood water and build ditches along the hillsides to catch the water as it comes down the side. This would break the flow and it could be run off to lighter grades. This would stop so much washing.

Mr. Burns was born Sept. 27, 1831. He was 83 years old yesterday, Sept. 27, 1914.

Where the Robinson Dry Goods Co. is now excavating for their new store on W. 7th St., between Hope and Olive Sts., they struck a bed of sand there last week. This sand came from a wash that used to run up into the hills just west of the Court House, an d on which the old woolen mills used to stand. This sand is not from the river but from this wash. Out near this locality the people used to turn their oxen out to grass at night, and they called it "Rincon de los Lueyes".

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136
Mr. J. C. Newell, 2417 W. 9th St., Los Angeles

Mr. Newell was seen this afternoon, Sept. 28, 1914 by F. Z. Lee at his home on W. 9th st.

Newell came to California 63 years ago and has lived in this section of the country for years.

The biggest flood he has known was that of 1862. The whole country to the south of the city was a solid sheet of water to the sea. At that time he had taken up a quarter section of land between Adams and Jefferson Sts., westward from Vermont. His home was back just a little ways from where the Catholic Church now stands at the

corner of Adams and Vermont Sts. In this flood of 1862 there was about three feet of water on portions of his place, and this water came from the Los Angeles river. From the hills they could see the water extended clear to the ocean.

There was always water in the Cienega and more or less marsh. They could check the water by building dams in the mountains, It is a wonder that they have never done anything with the lake on top of the mountain about ten miles a little west of north of Mount Lowe. There was never any fish in the lake for it gradually drained off during the summer. This lake covered perhaps fifty acres of land but do not know how deep.

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137
Mr. J. W. Gillette, 322 Temple St., L. A.

Mr. Gillette, was seen this afternoon, Sept. 30, 1914, at his home by F. Z. Lee. He came to this section of the country in 1862 and settled in Cucamonga for a while. Engaged in the cattle business. He saw some of the effects of the floods.

The rains of this southern country are very irregular and sometimes violent. The great floods have usually been at the latter part of a long slow rain, then would come a very heavy downpour when the earth was saturated, and naturally it would cause floods.

The floods from the Los Angeles river come from a watershed of 400 square miles so it is readily seen that at times there are violent rains in the mountains. It is the same thing with the San Gabriel river.

It carries an immense amount of water at times and there is no channel for the river. It has never been confined to one channel, just as in 1868 when there were very heavy floods and the San Gabriel changed its course to what is called New River.

The Los Angeles River has been put between two embankments within the city of Los Angeles but that is not enough. The channel is too narrow.

They say that if confined the river will cut a deep channel which is very true, just as the Colorado river has cut a gorge down through Colorado and Arizona. The river could cut such a steep channel that the sides would begin to slide in and we do not want that.

The soil of the country is very easy to wash owing to the great amount of sand and gravel in it. That is one reason why it will be difficult to control the rivers, that is to keep them within prescribed channels.

A lesson can be learned by observing the mouth of the canons and arroyos. They are filled with large boulders and gravel. Years ago it was our practice to go to the mountains on our holidays and vacations and it seemed as though we could hardly get up the arroyos on account of the boulders and I wondered why it was. The idea came

to me that the boulders were there to check the flow of the waters as they rushed down the canon and would have to wind in and out and round these boulders. The boulders seemed to say to the waters "do not rush down so fast, wait a little while" and so nature was putting a check on the rush of the waters to the sea so that it would do some good to the plant and tree in the valleys before the waters reached the sea.

So dams could be built in all those little canons and arroyos and would constitute barriers and checks andreservoirs the flood waters when the heavy rains came. These dams could be built cheaply The idea would be not to build just a few great structures, big concrete dams, but build hundreds, yes, thousands of little dams of rock, gravel, sand and earth. These small dams would hold the water back during the flood times and it would gradually work its way down into the valleys.

Big structures should be not built where there was a possibility of breaking and flooding and ruining the country below it.

The channels for the rivers should be large enough to easily carry the immense amount of water that sometimes comes down the canons. Just how big they should be is a problem for the engineers.

With all deference to the engineers, they are trained for their work and should be able to say what should be the kind and size of structures to be put in for protection against the floods. There is a great deal of jealousy among them. No engineer should be on the board who is not competent and who will do a man's job in this great work. They should be above small things and their integrity should be above question.

While not a capper for any one and not having any interest above that of good for all, I should say that this county should have, by all means, Wm. Mulholland on the board of engineers for this flood protection. His knowledge is invaluable to the people of this county, as he has been studying these questions over since he landed here. In the early days when others were off on a drunk or carousing around, he was in his bunk with a book studying hydraulics. A keen observer, nothing escapes him, as brave as a lion yet as tender as a child. So there are a few main things that should be remembered in this great problem--to hold the water back as much as possible with dams all over the watershed, to provide ample waterway for the floods, and men who will see that the work is done well and economically.

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139
Mr. Jesse S. Rose, 238 N. Ave. 20

Mr. Rose was seen at his house this afternoon, Oct. 1, 1914 by F. Z. Lee.

He came to this part of the country across the plains for his health, in 1859. He went out into the San Fernando Valley for a few years, but while there had not floods. He roved about a good deal, saw the country but remembers but little about it or the dates.

He once lived near 5th and Main Sts. and says that in 1867-8 there was a big flood and that any amount of water flowed across towards the southwest. There was at least twelve inches of water in San Pedro Street and perhaps more, as he wore boots and it was all he could do to get through without the water getting into his boots over the tops.

About three miles east of Compton, in 1889 they saw water very high there, almost enough to swim a horse.

There has been high water in the Arroyo Seco, and to let people go in there as they are doing and build houses so close to the arroyo is wrong. They will be washed away sure. There is at least double the amount of water in the Los Angeles river now as there usually is. We believe that there will be some big floods this winter.

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140
Mr. Wm. Mulholland, 502 Knickerbecker Bldg.

Mr. Mulholland was seen at his office, by F. Z. Lee, this morning, October 2, 1914.

As Mr. Mulholland said, he has never had anything to do with the river other than in connection with the water works, where their supply came from for many years.

There seems nothing strange or mysterious about handling the floods of the river if the lesson from nature was followed. It is no difficulty to do things when the work is carried on in harmony with Nature, but when man begins to obstruct the laws of Nature and to work against them, then there is great difficulty.

We had no trouble with the Los Angeles River until 1877-78. Up to that time the channel of the river was clear of willows and other growth that would cause the water to change about from one side of the river to the other. When the floods came they spread over the gravel beds of the river and ran along smoothly without obstruction. There were some willows along the banks of the streams but none out in the channel. The channels remained the same all the time.

Our trouble began as I say in 1877-78. The valley was grazed out to sheep and the sheep kept the willows back. There was nothing but grass in the channel when the floods came, and the waters flowed smoothly away.

Then when the sheep were moved away the willows grew up and formed obstructions which caused the water to cut into the banks and to wash away the farms.

Pure, clean earth is far more friable than banks of willows, for the willows give the water a footing, leverage which it uses to cut with. A bank of willows will wash away in a short time.

It is so with many obstructions in the river. It creates a whirl and the water churns and bores, boils against obstruction, making great holes. That was the case with the piling and piers in the river, where roots and other drift was found buried deep at the foot of the piling. The water at its highest flood carried away the gravel and sand and as the velocity of the water slackened and the drift was caught underneath the debris as it began to fill in the hole. That is true of any obstruction and the holes are dug only at those places. If it were not so, our pipe line would be carried out entirely, were it that the entire center of the channel moved down stream during floods.

Occasionally a pipe would be broken but that was where the foundations of the piers were undermined and the entire structure let in. But the entire bed of the river does not move downstream.

To build dams for reservoirs in the mountains to hold the water back would be too expensive for the amount of good it would do. The pitch of the country is too steep to create any reservoirs of any size. They would be more wedges and not large enough to do any great good. The highest water that has ever been here and the highest water marks that old people who have lived here forty to fifty years and who have personally shown me, where the water came to, has had a run-off of 50,000 second feet. A very careful measurement was taken of the stream where the North broadway concrete bridge now is. The present channel of the Los Angeles river is ample to carry away the water.

No man, no engineer, could invent or contrive such a wonderful system of water supply as this west coast has. There is no place in the world that I know of, which has the great amount of artesian or well water as this section of the country. It is called a semi-arid country and has only an average annual rainfall of fourteen or fifteen inches of rain. No one would think of trying to raise anything with that amount of water. This coast has had great upheavals and subsidences. Not in a folding and grinding sense of the strata, but a practical vertical lift and fall. There is a perfect coast line along the Palos Verdes hills. And the great deposits of gravel and sand, a porous material, has made a great reservoir of the coastal plains.

The varieties of water are due to this very change that has taken place--the reddish colored water at Long Beach comes from some part of the plain that was at one time a swamp. The sold waters coming from just such causes and the alkali waters from further-back in the mountains.

So it is this great bed of gravel, 600 feet or more deep, catches the water instead of allowing it to all run off into the sea.

Nature was wise in her plans for the delivery of the water from the high altitudes to the sea. When the waters reached the lower plains they began to wind back and forth, making the river longer and longer, and thus lessening the gradient of the river bed. The current of the stream being slower on the inside of the curve than on the outside, kept dropping its sediment and filling

in, while on the outside of the curve the stream was cutting away, thus making the windings greater and greater.

Now, if a channel was cut straight through, it would cut out a great channel, there and leave the banks high above the water they need so badly.

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143
Mr. George Pillsbury, 667 P. E. Bldg., Los Angeles

Mr. Pillsbury was seen this morning, October 2, 1914, by P. Z. Lee at his office.

Mr. Pillsbury came to Los Angeles in 1885. The first flood that he witnessed was one of 1886. Practically all of the bridges were washed out that year. He, with some of the men, went down on South Main Street to do some rush work. The streets were boggy and it was with difficulty that they reached there, and even when they did, they could do nothing, as it rained all day. This was on the 13th of January. They returned home and at that time Mr. Pillsbury lived on East Downey.

Next morning he heard all of the whistles blowing and knew that the river was up. So he hurriedly got a little breakfast and started out for town. There was a horse-car system of street roailways, and which usually stopped on signal but in this case it did not. It kept on going and he was wondering why when all of a sudden he saw the car and all go out of sight. Hurrying down to the bridge he found the street car conductor and his two passengers sitting on top of the car and all floating down stream. The horse was out from his reins and was swimming ashore. Another queer thing in this same flood.

Another man with a team was crossing one of the wagon bridges. He reached about halfway over when the approach on the end in front of him was washed out. Before he could turn around or back out, the approach behind him went out also. His predicament was not so dangerous, however, for the central part of the bridge stood.

There was an island between the river and Alameda St. Considerable water went down Alameda St., and did some damage to people in flooding them out.

In 1889 there was another big flood. It did great damage to the bridges and railroads, to vineyards and farms in the valley. The Los Angeles river changed its course further eastward through the Laguna ranch owned by Mrs. de Baker. She sued the Santa Fe for damages, claiming that their bridge caused the river to change and wrought damage to her property. She lost the suit, however.

This flood covered considerable territory, but the water did not get deep as some of the older floods did. Down around Compton there was considerable water and men were paddling about in boats but not everywhere they cared to go.

In 1884 I was told that boats came up from Wilmington and picked people up around Compton, Watts and near Dominguez.

The floods in the lower stretches of the valley do not hurt the people down there like they do up in the higher land, where it cuts a man's land to pieces and washes it away, while below they only lose a part of a crop at most and are benefitted greatly by the deposit of fertilizer which would cost them thousands of dollars in the way of silt.

The floods, when confined between embankments, will cut some, especially in the upper part of the country where the grade is much steeper than down below.

When the sand becomes thoroughly saturated it is much looser than when dry, but there does not seem to be any movement other than the surface, or wher e there is s ome obstruction, then the water washes out a hole, but usually fills it in again when the velocity of the water slacks up. Our bridges have always stood the floods, and their location has not changed in the least, indicating that there is no movement of the main mass or body of river sand.

In some instances the channels have filled up and the bridges over these have become useless. The flood would get out of the old channel and cut a new channel, a nd sometimes washout our track, and we would have to put in a new bridge at that point.

When we built our line at Covina careful inquiry was made about high water in that part of the San Gabriel river, and we were told that there had not been any high water for many years back. Since our lines were built the river has changed two or three times.

One great means of taking care of some of the floods is to utilize the big gravel beds or cones at the mouth of the canon. This gravel could be made to drink up a great amount of water by checking its rush to the sea by dykes and other means to retard the rush of the flood.

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145
Ex-Gov. H. F. Gage, P. E. Building

Mr. Gage was seen this afternoon, October 2, 1914, at his office, by F. Z. Lee. He has a long experience with the San Gabriel river, but believes that every one should take care of his part of the river. He is building protection works along the land fronting on the river. last winter the water left its old channel altogether and made a big bend to the eastward about a half mile, turned southward for perhaps another half and then back into the old river channel. It began erosion on a high bank just east of where he lives and would, if allowed to go on uninterrupted, have cut in and washed away his house and barn.

The old channel between the two bends where the water turned east and where it returned, did not carry a particle of water last winter. It is ten feet higher than the New River bed, but only four

years ago, he saw the water five feet higher than it was last winter.

In 1889 Gov. Gage went from Los Angeles to his place in a buggy and got across the river just before the big flood came. It followed right down behind him. Next morning he got up on his windmill and looked over toward Watts and there was water nearly all the way. The river was at least five miles wide. He has seen the river rise three feet in thirty minutes.

He has warned people about building in the low part of the river bottom, which is practically the river bed. One man just above Rivera built in there in spite of his warning him of the danger, and two years ago saw him completely washed out and everything a complete loss.

The reason the river overflows is because the channel is all choked up with willows. They do not keep the channel clean and give the water a chance to get away. They will not listen to the old timers who have seen the actions of the waters. Just as Mr. MulHolland said about the sheep keeping the Los Angeles river clear, and no trouble with overflows, just so with forest fires. When the sheep were in there, there were no forest fires and everything is all right.

Now, if you want to understand about the river, you must go out there and see it. I will go over the ground with you. But it is all rubbish what they propose to do. The people should take care of the river.

(Here Gov. Gage could not spare more time)

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147
Mr. J. E. Proctor, 801 Gladys Ave., Long Beach

Mr. Proctor was seen this morning, October 8th, 1914, by F. Z. Lee, on Ed. Hankins' place, a little more than three miles west of Compton, where he was drilling a well.

He has been in this section of the country for more than forty years, and has witnessed some big floods. They have never done the damage that the flood last winter did, for the reason that everything is different. In the early days, and up to within the last four years, the country was covered more or less with willows, brush fences, and in some places lakes, marshes, and other small growth. In those days the water would spread out all over the country, and the velocity was very much slower, it did no damage, and in many ways did good.

It was not necessary to fertilize the land, as they are now doing. They raised 100 bushels of corn to the acre, but not now. In those days a crop of corn and California pumpkins were raised on the same land. Those pumpkins would grow so thick that it was difficult to walkaround and step between them, while it was an easy

matter to go all over the place and never step on the ground, stepping on the pumpkins. The largest I ever saw weighed 214 pounds, and on our place we raised one that weighed 206 pounds.

So in this way the floods did a great deal of good. Each flood left a deposit of silt on the land that made the rich yields of those days. I am afraid the people will miss those floods, although in the last flood the land was washed very badly. That washing comes from the land being cleared off and having a freer run than before. There were no railroad embankments in those days either to hold the water either, where now it is held up, and the volume contracted into smaller space at the openings under the railroad. And too, a flood would break out and a strong current would cut across the country carrying things before it, and in the wake perhaps, cutting a channel that ruined the land. The fore part of the flood carried the big amount of silt, but the deposits were left by the last part of the flood.

On our place we have no fear of the flood that first comes, that does no damage, but it is the tail end of the flood that causes the damage. A place is started below us, and should a flood come again as last winter it will probably cut back and ruin our place. As it is we could do nothing with it this year; we could not rent it for anything.

Many peculiar things were noted in the flood of last winter. We had a chicken yard about 50 feet square, made of woven wire chicken fencing. On the inside of this fence, when the flood had gone down we found a deposit of sand and silt inside the yard about three feet deep. And another at a lower corner of the fence, a single strand of barb wire about 100 feet long, got loose except at one end, where it was held. Along this single strand of barb wire as it lay down stream had gathered a sand bar just back of the wire, or just below it, about 18 inches high.

These two things show what small obstructions can do. It gives us an idea of how little it takes to gather the silt, to form an obstruction that will soon turn the stream in some other direction.

So for a protection to the land I believe that a mat of willow roots and boughs would be more effective than anything else outside of a solid concrete wall and flood conduit for the water to travel in.

A channel 500 or 600 feet wide would probably carry the flood of last winter, but some of the others I could not say. The only objection to a wide channel is that when the tail end of the flood is running off it is liable to start zigzagging across the channel and then it is liable to cut the embankment. As long as the channel is clear and straight and enough water to partially fill the channel, everything would go all right, but the small stream that will not fill the channel will do a great deal of damage.

It is easy to get the willows to grow, they will grow anyway. The best way is get branches as long as possible, lay them with the buts upstream, and then partially cover them with sand. They should be placed at the bottom of the embankment in the river bed, and then they will get plenty of moisture.

Mere sand banks will not do, they will melt down like sugar. But something should be done, but not any great expensive works until they work out the most effective methods of handling the water. I have worked in water all my life, and have seen some funny capers by it.

We would like to have something done. Our land is of little value now, and if another flood comes, and the wash cuts back which has started our way, then it would go with the rest of it. Of course, we believe that the channel would change, and in that case the probabilities are that the washes on and near our land would all be filled up again.

I am satisfied that the flood waters do not affect the water in the wells. The depth to water in the wells does not vary during the floods anyway. The water enters the stratas back in the foothills and mountains and takes considerable time to reach the lower leads.

There is one thing which has always been noted, and which has not been explained. In August the water in the wells rises several feet, and when it would seem it would be the low stage, for there is usually much pumping at that time. The shallow wells are more affected than the deeper ones, and yet all of them vary. The shallow wells are much cooler than the deeper wells. We get water as cool as 54 degrees Farenheit, and the deeper wells show as much as 84 degrees Farenheit.

The clear water all comes from the shallow wells. When the depth of 300 feet is reached for instance in the Gardena district the water has considerable sulphur in it and is yellowish. Around Long Beach and Los Alamitos, the deeper wells all have yellow water.

In boring wells we strike some peculiar things. The size of the sand and gravel will vary a great deal in the same locality. In some wells there will be a deep body of coarse sand and gravel; sometimes there will be scarcely no sand at all. This well will be a strong well, and will hold up, that is will not diminish as some of the others do which have a finer material in the gravel. This gradually closes in shutting the water off. We sometimes strike the material with a fiber in it, and this will choke off the water very quickly. We have drilled wells close to such cases and find this fiber has matted in solid back 15 or 20 feet. All of these wells which had the flood overflow them have been shut off in the same way. The fine material would close the pores of the material, and effectively shut off the water.

The stratas of clay vary in thickness, and this is what makes our artesian water. The clay strata is practically impervious and dips down, so that when it is perforated the water rises.

I believe there is a great waste of water from old wells that have been abandoned and not plugged at the clay foundations. This allows the water from the lower stratas to come up into the higher stratas and thus lessens the pressure and lower the water in the deep wells. There are, no doubt, faults elsewhere the water comes up, but cannot be remedied.

Occasionally we strike a strata, perhaps a foot or so thick of tules or peat. It is black, and of the same consistency of our bogs here. We even bring up almost perfect tules and fox tails. This strata is usually very deep. This material probably discolors the water too, as at Long Beach.

The sulphur water is confined to certain districts as that of Gardena toward Long Beach. Everything south and west of that district is of a yellow colored water, whole north and east of this line is found the clear water. Just as around Artesia and Clearwater is found the clearest water. We sometimes find water with considerable lime in it which forms cakes and incrustations around the holes where we cut the pipe, finally closing off the water.

A few years ago I helped Mr. Hanson get all the logs of wells in this section of the country. They went into it pretty thoroughly and you can get those records. They will be better than anything I can give you.

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151
Mr. Thomas Gregory. 1273 E. 2nd Street., Long Beach

Mr. Gregory was seen at his home by F. Z. Lee this morning, October 9th, 1914. His experience has been principally with the floods of 1889-90 and down to the present time. Although he has lived in Long Beach for the past four years he has watched closely everything that has gone on in the way of floods.

The flood of 1889 was a great deal larger than that of last winter, and yet the damage was not so widespread as the last flood. The water spread over the country more evenly and did not cut up the land as it now is. There was water from Clearwater to Compton. In Compton the people were paddling around in boats, while in Belleflower and Summerset there was a vast amount of water. The main channel of the river passed right through Belleflower, but there is nothing to indicate it today, except the sand streak.

These rivers, the Los Angeles, and the San Gabriel have been all over the valley. It is a new river with them every time a big broad flood comes. The San Gabriel river shifts from one side of the valley to the other. Wherever the flood waters go they carry a vast amount of sand and silt, and as the grade of the river changes, the waters drop their deposits as the current loses its velocity. The velocity, just the same, is no small matter, as around Belleflower the flood brought down logs, trees, etc., and it would have kept any one moving pretty lively to have kept up with them.

Wherever the land was clear, and there was little or no obstruction, the water traveled along smoothly; but wherever there was alfalfa, a stubble field, or anything of that nature it would catch a great deal of silt. Even plowed land would catch more silt than the smooth land. A stump would give the water a foothold, and the water would begin to whirl and dig, and the first thing anyone

knew there was a great hole there, and from this the water began to cut back and make a channel. Wherever there seemed to be resistance to the water, the water would concentrate all of its energies.

In bank protection, if there was a smooth board bulkhead or wall, the waters would soon be scooping out a hole, and soon it would be down underneath everything and working destruction. We had to fight the waters many times, and in one instance we were trying to turn the waters where it was cutting away the bank, we cut down big poplar trees and anchored the butt ends upstream and let the tops drift down against the banks. This seemed more effective than anything we had tried. There must be something to catch the sand, something for it to lodge behind and build up. The small branches and leaves offer enough protection to create little eddies, and here is where the deposits begin to form.

It is only during the big flood years that much sand and silt is carried. In the usual years the rivers do not get out of their banks so much, nor do they carry much debris. Then the water would be controlled and held in its channel. It would not fill up very much, but when the big flood came down, I could not tell how much of a channel would be necessary to carry all of the water; it would be for only a short time, as the big floods are of short duration.

As the floods come down, they would begin dropping their heaviest material, the boulders and gravels nearest the mountains, and as the floods approached the lower part of the country, and the velocity began to slow up it would begin to drop the lighter debris, until it would finally be filled, and then you would have a river with its bed above the surrounding country, and there could be but one result. The waters would overflow the banks and break away to another part of the country, as it has done for centuries in this valley. Along the low places and old channels of the river we used to go out and raise the fence posts in our fence line across the low places as much as 3 to 4 feet at a time. We had a lever arrangement on the rear part of the wagon by which we could lift the posts up, which sometimes showed no more than two feet above the surface of the new ground. Where Summerset now stands there has been as much as fifteen feet filled in by the deposits from the river. Not 100 years ago the Los Angeles river flowed out through Ballona Creek, I have been told by the Mexicans I talked to 25 years ago. They claimed that the river changed in 1825 and flowed past the Dominguez hills for a time.

Many times I was up to Los Angeles, and on crossing the valley just below town, I would ask where the Los Angeles river was. They would tell me that I was in it, and that it never flowed except in extreme high water. The old road used to go out by Fruitland in those days, and during the flood of 1889 the river followed out in that direction and broke out into the Laguna country. That is the last time the Los Angeles river changed its course. There is no doubt but that it flowed out through the southwest of Los Angeles, for there is the river and gravel which clearly indicates it. The course of the river was changed by the deposits getting a little higher there than off toward Dominguez.

It looks like throwing money away to attempt to put all of these rivers into one. If there were any possibility of them being divided up and kept as small as possible, then there would be some possibility of controlling them. If the Los Angeles river could be sent out its old channel through the Ballona, and the San Gabriel carried through a channel between Long Beach and San Pedro, and New River kept where it is, going into Alamitos Bay, there would be more possibility of them succeeding than to attempt to put them all together. They will fill up and break away. Every attempt to do this so far, to control those streams, has been a failure. About 1889 Mr. Bixby spent $10,000 trying to protect property about Belleflower, and it was carried away in a night. The Dominguez Water Co. spent $100,000 on their project just below the Long Beach Boulevard bridge, and it was so much money thrown away.

About ten years ago the people formed the Artesia Protection district, bought a 200 foot right of way for it from Downey to the sea, and it has failed miserably.

To put the Los Angeles river into the San Gabriel and throw all into the Los Alamitos Bay is almost like trying to get water to run up hill. In 1889 there were immense quantities of water came down the New River until it reached about the place where the little old cemetery now is on the road to Clearwater, when a great deal of this water turned abruptly west, broke away from the main channel, and flowed into the old San Gabriel. The New River is a great deal higher than the old river. Even last winter water flowed back this same course.

I have seen so much water between Ocean Avenue and the cemetery, about three miles, and 3 to 4 feet deep, as to be impassable for a month or so. It seems to me that every effort should be made to hold all the water possible in the mountains. It is not necessary to build big dams; every branch of the river is a running stream in the rainy season, but is dry when the rain stops. Hundreds of small dams could be built in the mountains and all would hold some water. Even if they did not hold the water long it would accomplish what we are after, to break the effect of the floods. Besides, if the water went into the ground, it would add to the underground supply, which is gradually glowing smaller.

Another thing that will help some is to spread the waters out over the gravel beds at the mouths of the canons. All of this water will add to the water supply of the artesian flow. Before there were many wells bored in the valley, all were artesian. But as the number has increased the water supply has diminished and the level of the water has gone down. Now there are thousands of wells, and they pump more water than comes down the rivers. The stratas of water are different, but all seem to be good water. There is a dividing line just north of Los Cerritos, running in a northwesterly and southeasterly direction, which divides the clear water from the yellow water. The name "Clearwater" originated in this way, for all their artesian water, no matter how deep they went, was always nice and clear. The waters south and west of this line carries sulphur and is yellow in color. I think that the water must pass through beds of sulphur. It is only the deep wells, as for the city

of Long Beach, that show this discoloration. The deeper the wells are the warmer the water.

The well on my place, near Belleflower, was shallow, only about 170 feet deep. We struck a clean gravel, and at one time the water would rise in a pipe ten feet high. Gradually it went down, and now it is three to four feet below the surface of the ground. In the winter the water comes up again.

Old well drillers used to theorize as to where the outlet of all this water was. They argued that it was down at the Bolsas, in the peat land where all of the springs used to be. It seems that the greatest water-bearing stratas or streams lie in a northwesterly and southeasterly direction. There is water under all of this land, just as in Long Beach, but it is not so easy to get. This part of the land seems always to have been an island, as sand, gravel, etc., do not show on it as in the other sections. In these wells the gravel is worn just as smooth as river gravel, and no doubt was at one time in river beds. Proof that this country has been filled in is shown by the many logs struck by the well drillers in putting down wells. I have a piece of wood taken from one of the wells on my place at a depth of 170 feet, and is in a good state of preservation. I think it is redwood. (It is red cedar)

(Courtesy of Mr. Shaw)

Log of Well #4 at the Citizens Plant. 12" casing.

0 to 80	80'	Clay
80 to 330	250'	Clay and sand
330 to 380	50'	Gravel
380 to 430	50'	Clay
430 to 440	10'	Gravel
440 to 520	80'	Clay and sand
520 to 540	20'	Gravel
540 to 580	40'	Sticky mud
580 to 600	20'	Gravel
600 to 670	70'	Sand
670 to 790	220'	Clay
790 to 800	10'	Sand
800 to 860	60'	Gravel
860 to 935	75'	Clay and Quicksand
935 to 990	55'	Clay
990 to 1014	24'	Sand
1014 to 1028	14'	Gravel
1028 to 1030	2'	Good Gravel

12" Casing stuck,
Used 10" Casing

1030 to 1035	105'	All Clay and quicksand

Soundings -- Alamitos Group

No.	Sounding	Date
3	397.3	3-20-'13
4	489.5	3-20-'13

Citizens Plant

No.	Sounding	Long Dept.	Date	Bottom of Gravel
1	383.0	420	3-20-'13	406
2	405.9	456	3-20-'13	456
3	578.0	713	3-20-'13	615

2 Plugged by striking a pine log which was not drilled through

Barndollar's Plant

No.			
1	12"	1017	Bottom plugged
2	14"	684	

Bouton

No.	Sounding	Log Dept.	Date	Bottom of Gravel
S. Bouton 7"	308.5	400 U.S.A.	3-20-'13	320
N. Bouton 10"	243.5	400 U.S.A.	6- 5-'13	360
No. 1				
Central 12"		714		
No. 2				
W. of R.R. 12"		767		
No. 3				
N. Ely 14"		841		

158

Well No. 7

LONG BEACH WATER DEPARTMENT

Well No. 7
BIXBY
May 21, 1905

0 to 25	25' Soil
25 to 128	103' Clay
128 to 136	8' Sand
136 to 253	117' Cemented sand
253 to 306	53' Sand
306 to 322	16' Clay
322 to 346	24' Sand
346 to 360	14' Clay
360 to 417	57' Sand and Gravel with shells
417 to 425	8' Black Clay
425 to 447	22' Sand and Gravel
447 to 570	123' Sand
570 to 638	68' Clay
638 to 687	49' Sand
687 to 699	12' Sand
699 to 841	142' Gravel and Sand

158
Well No. 4

LONG BEACH WATER CO. NO. 4

Log of Gen. Bouton's Well on west side of Railroad, bored by J. B. Proctor

0 to 110	110' of Clay
110 to 210	100' of Sand
210 to 240	30' of Clay
240 to 278	38' of Gravel
278 to 320	42' of Clay
320 to 470	150' of Fine Gravel
470 to 530	60' of Sand
530 to 602	72' of Clay
602 to 620	18' of Sand
620 to 650	30' of Clay
650 to 680	30' of Sand
680 to 686	6' of Gravel
686 to 702	16' of Clay
702 to 740	38' of Coarse Gravel, cut or perforated 33'
740 to 742	2' of Cemented Sand
742 to 752	10' of Sand and Gravel
752 to 767	15' of Sand

All sand and gravel bears water under a high pressure.

The largest stream, 210 feet in depth from 320 feet to 530 feet, so far as now known, constitutes the largest stream or body of artesian water in the world.

For a continuous distance of 150 feet the gravel in this stream is coarse enough to permit of perforating the well pipe, which exceeds the entire depth of many of the artesian wells in California.

The above log or record of the formation passed through in boring this well shows a total of 467 feet of water-bearing sand and gravel. Some of the well borers express the opinion that a well can be bored every ten feet without exhausting this body of water.

159
Well No. 3

LONG BEACH WATER DEPARTMENT

Well No. 3. Bored for the Bouton Water Company, July 1899.

1 to 120	120' Clay
120 to 230	110' Sand
230 to 236	6' Clay
236 to 290	54' Coarse Sand
290 to 310	20' Clay
310 to 318	8' Sand
318 to 330	12' Clay and Sand
330 to 342	12' Clay
342 to 399	37' Gravel, Fine water
399 to 406	8' Clay
406 to 410	4' Gravel

410 to 418	8' Clay
418 to 450	32' Coarse Gravel
450 to 550	100' Fine Sand
550 to 620	70' Cemented Sand
620 to 670	80' Fine Sand
670 to 698	28' Clay and Gravel (cutting)Broken strata
698 to 714	16' Gravel (cutting)

160
Well No. 3

LONG BEACH WATER DEPARTMENT

Well No. 3

Citizens Water, Light & Power Company

0 to 141	141' of Clay
141 to 250	109' of Fine Sand
250 to 295	45' of Clay
295 to 315	20' of Fine Sand
315 to 365	50' of Clay
365 to 445	80' of Fine Sand
445 to 475	30' of Good Gravel
475 to 495	20' of Fine Gravel
495 to 515	20' of Fine Gravel
515 to 545	30' of Good Gravel
545 to 615	70' of Good Sand
615 to 669	54' of Fine Sand
669 to 685	16' of Clay
685 to 713	28' of Fine Sand

160
Well No. 2

LONG BEACH WATER DEPARTMENT

Well No. 2

Citizens Water, Light & Power Co.

0 to 209	209' of Clay
209 to 297	88' of Sa nd
297 to 313	16' of Clay
313 to 345	32' of Fine Gravel
345 to 415	70' of Sand and Clay
415 to 445	30' of Fine gravel and Sand
445 to 456	11' of Good Gravel

160
Well No. 1

LONG BEACH Water Department

Well No. 1

Citizens Water, Light & Power Co.

0 to 60	60' of Clay
60 to 120	60' of Sand
120 to 250	130 of Clay
250 to 305	55' of Fine Sand
305 to 319	14' of Fine Gravel
319 to 379	60' of Fine Sand
379 to 406	27' of Gravel
406 to 420	14' of Blue Mud

Records of logs of wells bored by Mr. F. S. Catey, 4th floor of the Thorpe Bldg.

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A well opposite Fish Canon on the Agricultural Park Farms, near the mouth of the San Gabriel Canon.

0 to 264 feet all cobble and boulders, entered bed rock, which is a decomposed granite. The well is 26 inches in diameter, and large chunks of the granite were brought up. The granite gets harder the deeper the well was bored.

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At the city of Azusa 750 feet west of Azusa Avenue and 600 feet south of Joe Dalton, for W. G. Hallwell, a well was sunk 236 feet to bed rock. There was only one kind of material until bed rock was reached, which was cobble and boulders. The bed rock is disintegrated granite, and the deeper the penetration the harder the rock. The well was sunk to 260 feet and was 26 inches in diameter.

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The Loftis well at Duarte, one-half mile south of the station and 500 feet east, was sunk 280 feet in cobble and boulders. Did not go to bed rock.

Mr. Catey has been drilling wells for eighteen years in this section of the country and has logs of hundreds of wells.

The stratas in the low country are softer and disintegrate much more readily than those higher up. For instance, up to the County Poor Farm the stratas are nearly the same. From the County Poor Farm to the Whittier narrows it is harder and fairly uniform, while above there to the mouth of the canon it is different again.

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162
Mr. F. S. Catey's records

From Mr. F. S. Catey's records
Pasadena Duck Club, Bixby Station,

October 24, 1908

12" well - 981-5.6' deep. No. 291

0 to 300	300' Clay
300 to 320	20' Sand
320 to 412	72' Clay
412 to 580	68' Sand
580 to 680	100' Clay and Shale
680 to 710	30' Sand
710 to 734	24' Clay
734 to 778	44' Sand

778 to 790	12' Gravel (cut)
790 to 802	12' Sand
802 to 826	24' Clay
826 to 852	26' Sand
852 to 874	22' Gravel and Sand (cut)
874 to 981-5.6	101' 5.6 Clay and Shale

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162
Montana Land Co.

MONTANA LAND COMPANY
near Artesia

Dec. 7, 1908 12" diam. - 892' deep
No. 249

0 to 25	25' Sand soil
25 to 150	125' Clay
150 to 204	54' Sand with Fine Gravel
204 to 340	136' Clay
340 to 354	14' Fine dirty Sand
354 to 638	284' Clay
638 to 658	20' Water Gravel
658 to 664	6' Clay
664 to 710	46' Sa nd
710 to 734	24' Clay
734 to 758	24' Dirty Sand
758 to 892	134' Clay

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163
Barbour & Ennis

BARBOUR & ENNIS
Near Rio Hondo

Nov. 2, 1908 - 12" well - 390'. No. 287

0 to 7	7' Soil
7 to 60	53' Sand
60 to 108	48' Gravel
108 to 112	4' Clay
112 to 120	8' Gravel
120 to 150	30' Sand
150 to 190	40' Clay
190 to 200	10' Sand
200 to 240	40' Gravel (cut)
240 to 260	20' Clay
260 to 300	40' Sand
300 to 350	50' Gravel (cut)
350 to 390	40' Sand

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163
A.E.Bell

A. E. BELL

Bell Station - 1364' deep. No. 58

0 to 30	30' Soil
30 to 70	40' Clay

70	to 92	22' Fine Sand
92	to 102	10' Clay
102	to 110	8' Fine Sand
110	to 138	28' Clay
138	to 158	20' Fine Sand
158	to 240	92' Clay
240	to 260	20' Sand
260	to 270	10' Clay
270	to 302	32' Sand
302	to 372	70' Clay
372	to 378	6' Sand
378	to 398	20' Clay
398	to 410	12' Sand
410	to 448	38' Clay
448	to 458	10' Sand
458	to 468	10' Clay
468	to 480	12' Sand
480	to 504	24' Sand
504	to 510	6' Blank Sand
510	to 514	4' Clay
514	to 556	42' Black Sand
556	to 568	12' Gravel
568	to 578	10' Clay
578	to 596	18' Gravel
596	to 600	4' Clay
600	to 604	4' Sand
604	to 640	36' Clay
640	to 706	66' Sand
706	to 726	22' Clay
726	to 738	12' Gravel
738	to 800	62' Clay
800	to 840	40' Cemented Sand
840	to 866	26' Sand
866	to 880	14' Clay
880	to 884	4' Sand
884	to 888	4' Gravel
888	to 900	12' Sand
900	to 904	4' Clay
904	to 906	2' Sand
906	to 910	4' Clay
910	to 970	60' Gravel (cut)
970	to 1030	60' Cement (sand)
1030	to 1070	40' Cement sand
1070	to 1162	92' Blank Sand
1162	to 1170	8' Clay
1170	to 1172	2' Gravel
1172	to 1200	28' Sand
1200	to 1216	16' Clay
1216	to 1222	6' Sand
1222	to 1250	28' Clay
1250	to 1258	8' Black Gravel
1258	to 1272	14'
1272	to 1280	8' Clay
1280	to 1330	50' Gravel (cut)
1330	to 1359	29' Sand
1359	to 1364	5' Gravel

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166

J.C. Bell

J. C. BELL, BELL STATION

May, 1899 - Depth 636' - No. 50

0 to 50	50' Soil
50 to 60	10' Sand
60 to 65	5' Clay
65 to 112	47' Sand
112 to 130	18' Coarse Sand
130 to 170	40' Clay
170 to 176	6' Sand
176 to 250	74' Clay
250 to 262	12' Cemented Gravel--Fine
262 to 290	28' Coarse Sand
290 to 306	16' Clay
306 to 366	60' Fine Sand
366 to 418	52' Clay
418 to 426	8' Coarse
426 to 444	18' Clay
444 to 462	18' Coarse Sand
462 to 588	126' Clay
588 to 594	6' Fine
594 to 602	8' Clay
602 to 612	10' Cemented (with roots and leaves)
612 to 636	24' Sand and sea shells

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166

San Marino Land Co.

No. 26

SAN MARINO LAND COMPANY

S. E. corner of Rosemead Ranch

14" diam. 1016' deep No. 26

0 to 20	20' Soil
20 to 40	20' Fine Gravel
40 to 44	4' Clay
44 to 62	18' Gravel
62 to 68	6' Clay
68 to 110	42' Coarse Gravel
110 to 126	16' Clay
126 to 136	10' Gravel
136 to 140	4' Boulders
140 to 160	20' Clay
160 to 204	44' Coarse Sand
204 to 212	8' Clay
212 to 250	38' Gravel
250 to 260	10' Cemented Sand
260 to 270	10' Clay
270 to 294	24' Sandy Clay
294 to 304	10' Gravel
304 to 312	8' Clay
312 to 330	18' Cemented Gravel
330 to 364	34' Hard Clay
364 to 398	34' Gravel and Boulders
398 to 404	6' Coarse Gravel
404 to 412	8' Coarse Gravel

412	to 440	28' Hard Clay
440	to 460	20' Hard Blue Clay
460	to 466	6' Dirty Gravel
466	to 530	64' Coarse Gravel
530	to 570	40' Red Clay
570	to 590	20' Blue Clay
590	to 612	22' Cemented Sand
612	to 634	22' Coarse Gravel
634	to 670	36' Hard Clay
670	to 682	12' Sand and Gravel
682	to 726	44' Blue Clay
726	to 736	10' Gravel
736	to 746	10' Cemented Gravel
746	to 758	12' Dirty Cemented Gravel
758	to 770	12' Cemented Blue Sand
770	to 774	4' Yellow Clay
774	to 785	12' Cemented Sand
785	to 818	32' Gravel
818	to 852	34' Blue Clay
852	to 858	6' Dirty Gravel
858	to 878	20' Gravel
878	to 882	4' Clay with Gravel streaks
882	to 892	10' Yellow Clay
892	to 908	16' Cemented Sand
908	to 918	10' Sand and Gravel
918	to 946	28' Clay
946	to 1016	70' Gravel, coarse

This well was cut in all gravel from the bottom to 212' from the surface.

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168
No. 14

SAN MARINO LAND COMPANY
S. E. corner of Rosemead Ranch,
Diam. of Well 14' 1020' deep
No. 14

0	to 20'	20' Soil
20	to 40'	20' Gravel
40	to 44'	4' Clay
44	to 62'	18' Gravel
62	to 68'	6' Clay
68	to 110'	42' Gravel, coarse
110	to 126	16' Clay
126	to 136	10' Gravel
136	to 140	4' Boulders
140	to 160	20' Clay
160	to 204	44' Sand, coarse
204	to 212	8' Clay
212	to 250	38' Gravel (cut)
250	to 260	10' Sand, cemented
260	to 270	10' Clay
270	to 294	24' Clay, sandy
294	to 304	10' Gravel (cut)
304	to 312	8' Clay
312	to 330	18' Gravel, cemented

330 to 364	34'	Clay, hard
364 to 398	34'	Gravel, boulders (cut)
398 to 404	6'	Clay
404 to 412	8'	Gravel, coarse (cut)
412 to 440	28'	Clay, hard
440 to 460	20 '	Clay, blue hard
460 to 466	6'	Gravel, dirty
466 to 530	64'	Gravel, coarse (cut)
530 to 550	20'	Gravel, cemented
550 to 570	20'	Clay, red
570 to 590	20'	Clay, blue
590 to 612	22'	Sand, cemented
612 to 634	22'	Gravel, coarse (cut)
634 to 670	36'	Clay, hard
670 to 682	12'	Gravel, sand (cut)
682 to 726	44'	Clay, blue
726 to 736	10'	Gravel (cut)
736 to 746	10'	Gravel, cement
746 to 758	12'	Gravel, dirty, cemented
758 to 770	12'	Sand, blue, cemented
770 to 786	16'	Sand, cemented
786 to 818	32'	Gravel, (cut)
818 to 852	34'	Clay, blue
852 to 858	6'	Gravel, dirty
858 to 878	20'	Gravel, (cut)
878 to 882	4'	Clay with embedded gravel
882 to 892	10'	Clay, yellow
892 to 908	16'	Sand, cemented
908 to 918	10'	Sand and gravel
918 to 946	28'	Clay
946 to 1020	74'	Gravel, coarse (cut)

Well flows

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170
No. 24

SAN MARINO LAND COMPANY
S. E. corner of Rosemead Ranch
Diam. of well 14" 1202' deep No. 24

0 0 to 30	30'	Soil
30 to 36	6'	Sand
36 to 204	168'	Clay
204 to 220	8'	Gravel
220 to 230	10'	Clay
230 to 250	20'	Dirty Sand
250 to 270	20'	Clay
270 to 308	38'	Sand, gravel (cut)
308 to 348	40'	Clay
348 to 356	8'	Coarse gravel and boulders
356 to 452	96'	Hard Clay
452 to 470	28'	Gravel (cut)
470 to 480	10'	Sandy Clay
480 to 530	50'	Gravel (cut)
530 to 622	92'	Clay
622 to 630	8'	Coarse Sand
630 to 750	120'	Clay

750 to 762	12'	Coarse Sand
762 to 800	38'	Clay
800 to 808	8'	Sand
808 to 836	28'	Clay
836 to 870	34'	Gravel (cut)
870 to 896	26'	Clay
896 to 916	20'	Gravel (cut)
916 to 934	18'	Clay
934 to 946	12'	Gravel (cut)
946 to 956	10'	Clay
956 to 964	8'	Blue gravel (cut)
964 to 1140	176'	Clay
1140 to 1151	11'	Gravel and coarse sand
1151 to 1202	51'	Clay with streaks of gravel

Water flows over pipe at surface of the ground

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172
So. Calif.
Edison

Southern California Edison
Gaspar, California
June 24th, 1914 - Southern California
Drilling Company, drilled by
T. G. Kwasigroch

0 to 10	10'	Sand
10 to 73	63'	Sea mud
73 to 109	36'	Fine sand
109 to 119	10'	Fine sand and gravel
119 to 137	18'	Water gravel
137 to 151	14'	Blue clay
151 to 201	50'	Sea mud

Water stands four feet from the surface of the ground.
Perforated from 111 to 139.
Cuts 4 and 3 to the circle alternating. Cuts 10" long and raised 12".
Case with 12" double #12 steel casing.

City of Whittier
Well No. 3

0 to 15	15'	Soil and gravel
15 to 27	12'	Water and gravel
27 to 35	8'	Clay
35 to 77	42'	Water and gravel
77 to 83	6'	Sandy clay
83 to 87	4'	Water and gravel
87 to 112	25'	Clay
112 to 117	5'	Yellow Clay
117 to 120	3'	Sandy clay
120 to 153	33'	water and gravel
153 to 326	173'	Yellow Clay
326 to 353	27'	Water gravel
353 to 375	22'	Yellow Clay
375 to 390	15'	Clay with some gravel
390 to 405	15'	Cemented clay

405 to 423	18' Water gravel
423 to 438	15' Clay cemented gravel
438 to 463	25' Yellow clay

26" well

173
Cross Land Co.

Cross Land Co.
near Bassitt, Calif.
14" well finished August 20, 1912
by J. A. Hanson

0 to 10	10' Soil
10 to 31	21' Clay
31 to 37	6' Sand
37 to 56	19' Clay
56 to 81	25' Water gravel
81 to 85	4' Water gravel
85 to 97	12' Water gravel
97 to 107	10' Clay
107 to 123	16' Gravel
123 to 124	1' Clay
124 to 154	30' Gravel
154 to 159	5' Clay
159 to 161	2' Gravel
161 to 170	9' Clay
170 to 173	3' Gravel
173 to 177	4' Clay
177 to 198	21' Gravel
198 to 203	5' Clay
203 to 206	3' Gravel
206 to 220	14' Clay
220 to 229	9' Gravel
229 to 257	28' Clay
257 to 270	13' Gravel
270 to 275	5' Clay
275 to 289	14' Fine Sand
289 to 291	2' Clay
291 to 293	2' Clay

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175
Dr. A. C. Cook, Cor. 7th & Orange Ave., Long Beach

Dr. Cook was seen this morning, October 22, by F. Z. Lee, at his home.

During his experience he has seen many changes in the country and the locations of the rivers. In the early days the country was covered by a dry weather kind of vegetation, principally. Of course, in the low lands thereswas some farming and tree culture but it was very scattering.

Ross Browne, who enjoyed the confidence of the government fifty years or more ago, as superintendent of the Indians in Arizona,

and afterwards made Consul General to China was sent to California to make a report on the country by counties. He rode over the state horseback and gathered all information possible at first hand and from his own observations. He described Los Angeles County as a barren desertlike country, there being very little farming and principally given over to stock-raising by a rather indifferent and laggard citizenry. That the future of the country was very uncertain and would probably not be developed to any extent for many years.

A few years after this he was superintendent of the mails and was attending to the dispatching of the mails from San Pedro Harbor by stage coach, pack and otherwise. He decided to make a trip to Yuma on one of the mail hacks, a covered vehicle seating four persons inside. Leaving San Pedro for Santa Ana, the hack was going along steadily, Ross Browne arranging some of his papers inside the hack and not paying any attention to the country they were through. Suddenly it began to grow darker on the inside of the hack and Mr. Browne called out to the driver asking if they were getting near a forrest. The dirver told him - No. Then Mr. Browne asked what made it so dark, and the driver asked him to look outside and see. To the amazement of Mr. Browne they were going through a corn field, where the stalks were tall enough to shut off the sun and made the shade which caused it to grow darker in the coach.

He arrive at Santa Ana and began looking about and talking a little to the people and decided to lay over there that trip and investigate further. He said he had made a report of the government's asking, stating that there was little land for cultivation and that he did not want to stay on record as he now was and that he wished to send in a revised report to the government correcting the first one.

Dr. Cook states that when he lived in Los Angeles his practice used to take him out over the country considerable distances in those days and his means of reaching his patients was by horse and buggy. In his drives he noticed the country and as he passed over hills and ridges he often observed the rivers and vegetation that grew upon the land.

The rivers after passing a short way down from the hills, began to spread out like a fan. There were three distinct soils and accompanying them were three kinds of vegetation that grew upon them. There were always the white lands of white river sand that spread like the ribs of a fan, showing the various deltas or branches of the river as it spread out or as the river changed from time to time. On each side was the strip of silt land, a brown soil, and then in the middle and perhaps a little lower than the river bed was the black marshy lands.

The vegetation that covered these soils were, first, very little, if anything, on the white sands. There were occasionally some of the verbena vines running over the sand, but practically nothing more. Second, there would come the wild mustard and filigree (?) grass. These growths sprang up almost on a line, for only two or three feet away from the white sand. The silt made all the different in the growth of the wild mustard. Third, below the filigree grass the vegetation changed to marsh grasses, which would be the only thing that would grow upon the black and alkali soil.

This was a condition characteristic of the Los Angeles, the San Gabriel, the Santa Ana rivers, and although the white sand was the bed of the stream, it was nearly as high as the banks where the silt began. They could hardly be called streams, and yet, it was dangerous to cross one of them when there was less than two feet of water flowing over them. All of these streams carried quicksand and it was a hard matter to tell that any of these pockets of quicksand were around. They could not be distinguished from the other parts of the river, and once in them, they were dangerous.

The old settlers recognized the various soils as indicative of the kind of crops they would grow best. They all preferred the silt soil where the wild mustard and filigree grass grew. That would raise the finest corn. The black alkali land was not good for scarcely anything in those days, and no one wanted it. They would not pay more than two or three dollars an acre for the alkali peat land, but now, of course they pay almost any price for it.

It was impossible to get an eight acre tract without some of those strips of sand, or alkali cutting across it somewhere.

The corn land raised wonderful crops. I have known it, in fact, on my place at Garden Grove, that land has raised 150 bushels of corn per acre. I have seen a great deal of corn that I could not jump up and touch the ear of corn on the stalk.

I looked the country over pretty well before I bought any land, and finally in 1874 chose 160 acres at Garden Grove. There has never been any river flow down through there in my time, and yet the same conditions hold there that I have been telling you of.

The land clear across the whole valley would tell one that the rivers may have been changing this way for centuries and that they may have been anywhere. There is no doubt that the Los Angeles river has flowed out through the Ballona harbor although no one has ever told me that they have known it to do so.

That is what has made the coast what it is, and at the same time I believe that there is a gradual upheaval here pushing the land higher and higher.

While I believe that we had less rains in those days, still we had no trouble getting water. I put down a well, you could almost call it a spring, for it was only three feet deep. There were many wells where they had to go down not more than seventy feet to get an abundance of water, artesian water. As more wells were put down the water level began to fall and a few years ago, the last I have noticed regarding the wells, the level at our old place had dropped to eighteen or twenty feet. The deepest wells were only 200 to 300 feet in the early days of artesian water.

At about that depth a strata of peat was struck which discolored the water. There seemed to be some sulphur in it too, but that probably came from near the mountains.

There is no doubt that the main supply of artesian or underground flow of water comes from far back into the mountains. The surface water does not affect the supply any appreciable amount.

During the flood of 1889 I distinctly remember an incident which gives an idea of how much water there was in the valley at that time. It happened that I started to Los Angeles from San Pedro by train. The train was in charge of Conductor Truaxe and among the passengers was Mr. Denio, who was then a student and attending school in Los Angeles.

We arrived at the bridge which crosses the Compton Creek when we had an accident. The engine and express car got across the bridge safely but the mail car went through the bridge, and one or two more cars went into the ditch. We finally returned to San Pedro and it was two nights before we could continue our journey. It took the flood that long to run off. I remember quite well that the whole valley was a flood of water, that the stream seemed to come from the direction of the old adobe house on the point of the Los Cerritos hill where George Bixby was born. This water was pouring through the bridge that caused our wreck and was running into Nigger Tom slough.

Two or three years after this every one noticed a dreadful stench coming from the direction of Nigger Tom slough and it was found that the slough was drying up and leaving tons and tons of dead carp fish rotting in the mud. People went there and hauled away wagon loads of the fish for fertilizer and other purposes. Finally it became so bad that people began to leave Long Beach, and an appeal was made to the supervisors for relief. Trenches were dug and a great amount of the fish were buried.

There was another pest that almost drove the people out of Long Beach and that was when Mr. Clark built his beet sugar factory at Los Alamitos. They threw the pulp into Coyote Creek and it finally drifted towards the sea. Mrs. Bixby, Fred's mother, brought suit against the sugar factory and was successful in compelling them to take care of their pulp. This action saved Long Beach from the suit and stopped people from leaving here as they could not stand the nauseating stench of the rotting pulp. Many people left before it was stopped.

There has been water all over the valley from Dominguez to Santa Ana and Westminister. An old German who lived in Anaheim told me that in the flood of 1884, a rough boat was built and the man traveled from Anaheim to Westminster by means of his boat and that there was plenty of water.

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180

Mr. G. O. Newman, 707 Garland Building

Mr. Newman was seen at his office this forenoon, October 22, 1914 by F. Z. Lee. Although not familiar with the lower stretches of the river, he has seen a few things and has a thorough knowledge of the narrows, and above into the mountains.

Mr. Newman has known the San Gabriel, Santa Ana and other streams since 1880. While with the P. L. & P. C. they began taking rainfall, run-off, etc., in 1886. During the period of twenty-eight years there has not been the high water that there was in 1910 and 1914.

The highest flood they had ever known before 1910 the water rose six feet on the tower at the headgates. In 1910 the water came up to the floor and in 1914, last January, the water rose six feet over the floor.

This tower rises twenty feet above the bed of the river. The U. S. Government hydrographic observers asked Mr. Newman as to his opinion as to where the gage for the stream should be placed. He suggested the headgates being as good as any place available, for there was but a small amount of water that entered the canon between the headgates and the mouth of the canon, and the attendant there at the headgates could take the reading on the gage and report it daily. This arrangement was made and the gate reading was taken until last January, when the gage was carried away by the flood. However, there was a good man up there, and he marked where the high water reached and point this out to the hydrographer when he came up.

It is impossible to tell what the river will do. The water may come from one of several branches of the river. One day a flood came down and was entirely from the west fork, and the water was almost as black as ink. There had been a fire over in that district. However, the greatest amount of water comes from Iron Creek and Fish Creek. When these big rains come they may cause a landslide which will dam up the canon to a great extent, and when the obstructions dam up the water and then break, they may let down an immense amount of water very suddenly should the obstruction give way.

The sides of the canon are very steep, and rise from one thousand to two thousand feet above the bed of the stream. The slopes are heavily timbered and have considerable undergrowth. When a slide occurs, it carries immense quantities of material with it, as well as all the timber in its path. Some of these trees are sixty feet long and of good timber. The slide may occur in a place where all of the material is of fine sand and not much stone. Then again, the slide may be where there are immense big boulders and coarse rock and material. It would never do to build a dam in the lower part of the canon for a reservoir site. One good rain and it would fill completely full of debris. One season would fill any reservoir, and for this reason it would never do to try to conserve any water near the mouth of the canon. There is one point higher up where a dam might be built and considerable water held. This dam would probably be 150 to 200 feet high, but, by itself it would soon fill. There would have to be an auxiliary dam above it to catch the debris as it came down this mountain, and the water let down into the lower dam through a by-pass. But to think of dams in there would merely mean money thrown away.

A channel to carry the water to the sea is a great, big, serious problem. No one can tell what is going to take place in these Southern California rivers. They carry so much debris that the

bed or channel is going to build up in most places, while last winter the bed of the river between Azusa and El Monte near the P. E. bridge, it seems, cut out four to six feet in the channel; but in other localities it has filled up, and will fill up more or less all the time, because there is not grade enough to carry the material away.

If the water is confined enough, it will produce the velocity necessary to carry away most of the material, but if the channel is made to carry a small flood, when a big one comes, it will fail of its purpose. Again, if the channel is made wide, then when the ordinary floods come, the water will spread out, lose its velocity, and deposit its load of detritus.

This is another thing about the material, debris, that comes down from the canon. If it is one of the slides where most of the material is fine sand and silt then it will travel a long ways, provided there is ample flood, and the channel is narrow enough, or the channel would not be filled up if there is grade enough in the channel. But, if the slide is of coarse, heavy material, and the flood is not very big, all of this material will be dropped very quickly and the bed of the channel raised.

For these and other reasons it is impossible to say what the width of the channel should be. In light floods it should be narrow, and in big floods it should be wide. The only way that the material, debris, will be carried away is by the velocity of the water. Without confining the water there is not grade enough to produce the velocity. In small floods the channel should be narrow, and in big floods this condition would not carry the water.

A channel 300 feet wide at the mouth of the Narrows would carry the water, but in the lower country where the grade changes, it would be hard to say, In fact, it is going to be several years before anything satisfactory will be attained. It will be necessary to try a good many things, systems and sizes of channel, before the water will be under control.

There are many forms of bank protection, but few are of much value. Riprap is no good if the water gets to cutting in underneath it, for it will crumble away like a paper house on fire. If riprap is protected by wire and brush it serves very well.

In the upper part of the valley where there are large boulders, it will probably be the best form of bank protection, since piling can not be used advantageously. The bank should have a flat slope, and after the riprap has been placed along the bank it should be divided off into panels, so to say, by anchoring the foot of the piling into sand and gravel, and laying these piles back on the slope. Then put barb wire over these posts about six inches apart for protection. This wire catches grass, roots, leaves and other matter coming down and forms a mat over the rock and prevents the water from getting underneath and cutting off.

Concrete retaining walls will not do, for the water will get in underneath, and behind the concrete, taking out the sand, and the foundation, and letting it fall in, and all is lost.

Piling without barbwire is poor, for the piles merely give the water leverage to shoot down and uproot everything. But if there is rock thrown in between the back of the piles and the face of the piles covered with barb wire, it make_a very substantial revetment.

When the looser and finer soil is reached, away from the big boulders the simplest, cheapest and as effective embankment that can be found is to put in piles about 6 x 6, 12 to 14 feet into the ground, and then face it with barb wire about six inches apart. This will effectively turn any water.

The piles can easily be driven by a jet of water and very rapidly. Mr. Newman has sunk cottonwood poles six to eight inches in diameter 12 to 14 feet deep in to and three minutes, merely with a jet. By using green cottonwood poles during any month with an "r" in it, poles will take root and grow, affording very good protection. Willows are good used in this way too, but they must be protected by the barb wire.

It will be an experiment for several years to come. The size of the channel and the method of protection must be tried out. I have had many years of experience in handling water in streams, and know what water will do in this loose soil.

During the heaviest part of the floods the water carries a great amount of debris. On one occasion in the Santa Ana river a cup of water was dipped out of the stream and allowed to settle. The result showed about 50% solids. The San Gabriel carries perhaps 50% at times. These floods always carry more or less debris, and it depends upon the kind of material, the amount of the flood, how well confined the water is, whether the velocity is maintained, and its duration, where this material will be deposited, but that one fact cannot be gotten away from, that this debris must be taken care of.

If the water is controlled, kept between two embankments, it is going to fill up the channel as the weight of the material and the velocity of the stream varies on its way to the lower lands. Provision must be made to extend and build up the embankments, and even then, there will have to be changes made from time to time.

But no man knows, and this must be studied and experimented with and tried out, and in the course of a few years valuable knowledge will be gathered which will enable the engineers to satisfactorily handle the problem.

A great deal has been said about the movement of sand in the river beds during floods. It depends upon the kind of material/ In streams where there is much fine material there is a movement, but if the material is coarse it will not move as a body.

Some years ago we built a flume on piling across the Santa Ana river at Colton. A flood came along and took out about 200 feet of this flume. A portion of it was left standing however, near the center of the stream. Upon investigation I found that a portion of this piling had moved bodily down stream about seven feet. It was in

good condition, about the same elevation and general alignment as before, except that it was setting off to one side.

The condition of the contract was that the piling should have a penetration of at least fourteen feet. It looked as though the contractor had not carried out the conditions, so I sent for a block and tackle and tried to pull some of the piling. They proved to be very firm and solid, but I was determined to see to what depth they were driven. After digging considerably we got them out and found they were down fourteen and one-half feet.

This proved conclusively to me that during these big floods the quicksand and other light material in the bed of the stream became a semi-liquid, and that there was a distinct movement of the whole mass downstream.

On what we called the Salt Lake bridge over the Santa Ana river near Colton, there was a clearance of perhaps four feet between the sand and the bottom of the girders on the bridge. From where it stood to the sand should have been about ten feet. It occurred to me to test the depth of the sand. I got a pole 30 feet long and attempted to sound the depth of the stream, but it was too swift to thrust down perpendicular, so I cast the end of the pole up stream and shoved it down, holding out the end. The end of the pole swung clear at the bottom.

It would seem that the sand in the bed of the stream became very mobile and liquid for no resistance was offered to the pole for about ten to twenty feet below the supposed bed of the stream.

In the San Gabriel river the material is much coarser and would not do this. It is only in streams that carry too much light material and quicksand as is found in the Santa Ana river, that such a movement takes place.

The all of these streams the greatest portion of debris goes down with the first big floods, and as the water subsides the streams rapidly clear up, and therefore, carry very little material.

In wells dependent upon the shallow stratas for their supply of water, the water level is liable to drop considerably. During the rains, of course, the water lead rises again. Now the supply surrounding each well, as the water level drops, leaves a body of material shaped like a cone, its apex being at the water level in the well, and flaring out like a funnel as it rises to the surface. This cone is drained of its supply of water.

When the rains come, to completely replenish the supply, it is, partially, only necessary to fill the cone shaped portion surrounding the well.

It was a theory of mine that if the clear water of the floods could be poured directly into these wells it would replenish the supply much more quickly than to wait for the water to sink into the surface of the earth and spread out until it reached the well, and

then begin to resupply the drained area around the well. It was my idea to wait until the water began to run clear on the debris cone, then divert the water directly to the well. I persuaded some people to try this and it worked like a charm. The clear water did not harm the well, as it carried no material to choke up the pores of the gravel-bearing stratas, and promptly filled up the drained material immediately surrounding the well. This I believe is practical at the mouth of all these canyons.

I persuaded the Company to try distributing the flood waters of the Santa Ana river over its debris cone; the effect was marked and immediately.

The people have obtained from the Government a guarantee not to sell any of the land set aside for this purpose, which is four or five sections.

This has made a marked difference in the wells below this section of the country. During the dry season the wells drop lower and lower, but when the floods flow out over the gravel cones, the coarse material drives up the water remarkably fast, and the effect is apparent on the wells immediately.

The debris cone of the San Gabriel is fully as large as that of the Santa Ana river. Azusa and Covina are situated on this cone, and would feel the effect of distributing the flood directly.

There is no reason why the flood waters of the San Gabriel could not be used directly, as at Colton on those wells, for in a short time after the main flood passes, the water runs practically clear, and could be run directly into the wells.

I have made close observations of the effect of pumping on wells situated on the Santa Ana river. For instance, the well on the Towne place when pumping would lower the water considerably in the Gage wells, or vice versa. I have stopped the pumps on one place and noticed an immediate effect on the other wells.

So that shows that the source of the water is quite near. Of course, as is well known, water travels only about three miles per year underground, so it can readily be seen that there must be a vast amount of water stored in these immense beds of gravel and sand.

Just where the water in the deep stratas comes from, I do not know, but I do not believe that it comes from across the mountain ranges. I think the stratas are tilted and broken up too bad to come from that source.

The supply in the San Fernando Valley is immense and wonderful. In my opinion I do not think it was necessary to go to Owens river to get a sufficient supply for the city of Los Angeles, as I believe that there is ample water in the San Fernando and for one million dollars we would have been able to develop all the pure good water for our needs--and much better water than the Owens River water.

There is a peculiar condition on the Santa Ana river. There is a dike starting in just below Colton and running in a westerly direction toward Whittier hills, which shuts off the water from flowing toward the sea. We have tried it out, especially in one case.

The Company wanted to drill a well at the Towne place, and Frank Cutler who was their superintendent told them to go ahead and drill the well in a certain place, as they need not wait for Newman. So they drilled the well and put it down more than 200 feet below those of the other group, which were quite near, but they got no water. Finally they sent for me to learn what the trouble was. I looked the ground over and told them if the well had been drilled 50 feet nearer to the group, they would have gotten water. Well, Frank Cutler poopoohed the idea, and said some other silly things, and while they were delaying the work, one night the pressure from one of the wells crushed the casing in, and they had to drill another well along side of it as the water was closed off. Finally a well was put down where I directed and they got a good supply of water.

I locate all of my wells with a willow, and it has never failed me. I believe the water develops electricity, and that the green willow is affected by the water in this way. It works better with some than others, in fact, some peple cannot get results at all. However, I have convinced engineers under certain conditions that there was a potency in the willow branch method of locating the water.

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189
Mr. Walter P. Temple, El Monte, Calif.

Mr. Temple was seen at his home at Old Mission, west end of the Mission bridge this morning, October 20th, 1914, by F. Z. Lee. He was born in 1870 at the old Temple place, and grew up in this Neighborhood. However, his memory of the floods is not very sharply defined. The flood of 1883-84 was the largest of any in his time. In that year the San Gabriel river changed its course shomewhat in that it cut across into Rio Hondo just below the Whittier narrows.

The Rio Hondo is only a little drain which empties into the San Gabriel river just above the old part of Mission bridge, and is only about two miles long. It is fed by seepage of the lowlands between the two San Gabriels.

The flood of 1911-12 did considerable damage, but nothing like that of last winter. This flood cut in toward the west further than usual, but practically there was no wash there last winter.

The first part of the old Mission bridge as it was put in was foreseen to be a menace in the flow of the river, and a protest was filed at that time with the Supervisors against putting in such a structure. The people in this vicinity knew the conditions and the amount of water that came down the river, and with the channel choked with piling they knew that there would be trouble. The people wanted a span bridge.

Another thing, the bridge is too low. The channel has filled up four or five feet, and there is only four or five feet headway now under the bridge.

The Supervisors had a string of piling driven on the east side of the river expecting that to turn the water under the bridge, but it was money thrown away. Now, since last winter's flood, it can be seen what will happen if big floods come this winter. It will cut to the eastward until it cuts through to New River. This could easily be prevented if work was begun at once, and it could also be put in to conform to any future work that might be desired to carry on in the future.

The people need this protection and should have it without waiting until their land is ruined. A small amount of money spent now, compared to the ruin that the floods cause, would keep the rivers near its old channel.

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The county road for a half mile has been washed away. There should have been some action taken to prevent that. Something should be done now to prevent further washing. This road cost considerable money, besides the roundabout way the people have to travel now. A petition has been placed with the Supervisors for a road along the base of the hill beginning near the west end of the Old Mission bridge, running southwesterly to Los Angeles. This will afford a very easy and direct route to Los Angeles.

The artesian water in this vicnity has not been developed to any extent. My well here is only 105 feet deep, and affords all the water we need. The pump takes out about twenty inches per minute. There is some sulphur in it, but it is good clear water. The last 50 feet is all water bearing gravel. The bottom of the well ends in a red clay which the well drillers could only make about 4

(Note: Continued on page 138 of this copy)

Donald M. Baker

Cate Ditch Co. vs. Whittier Water Co.

Table No. 1

Seasonal precipitation at Los Angeles Los Angeles County, California for 35 seasons from 1877-78 to 1912-13 inclusive. F. C. Finkle, Cons. Engineer.

April 1914 Elevation 293'

Season	Precipitation in inches
1877-78	21.26
1878-79	11.35
1879-80	20.34
1880-81	13.13
1881-82	10.40
1882-83	12.11
1883-84	38.18
1884-85	9.21
1885-86	22.31
1886-87	14.05
1887-88	13.87
1888-89	19.23
1889-90	34.84
1890-91	13.36
1891-92	11.85
1892-93	26.28
1893-94	6.73
1894-95	16.11
1895-96	8.51
1896-97	16.86
1897-98	7.06
1898-99	5.79
1899-00	7.91
1900-01	16.29
1901-02	10.60
1902-03	10.32
1903-04	8.72
1904-05	19.52
1905-06	18.65
1906-07	19.30
1907-08	11.72
1908-09	19.18
1909-10	12.63
1910-11	16.18
1911-12	11.60
1912-13	13.42

Mean 15.39

Note: Seasons cover periods from July to June 30, inclusive

192 Cate Ditch Co. vs. Whittier Water Co.

Table No. 2

Seasonal precipitation at Clairmont, Los Angeles County, California for 36 seasons, from 1877-78 to 1912-13 inclusive. F. C. Finkle, Cons. Engr.

April 1914 Elevation 1200'

Season	Precipitation in inches
1877-78	26.90
1878-79	13.80
1879-80	25.23
1880-81	15.92
1881-82	12.87
1882-83	14.63
1883-84	49.77
1884-85	11.79
1885-86	27.98
1886-87	16.80
1887-88	16.60
1888-89	23.73
1889-90	45.25
1890-91	14.25
1891-92	13.58
1892-93	25.28
1893-94	11.37
1894-95	24.41
1895-96	9.58
1896-97	23.14
1897-98	11.03
1898-99	7.85
1899-00	10.65
1900-01	20.02
1901-02	12.45
1902-03	18.31
1903-04	10.89
1904-05	22.75
1905-06	21.65
1906-07	26.29
1907-08	15.64
1908-09	22.28
1909-10	17.18
1910-11	22.59
1911-12	14.06
1912-13	13.28

Mean 19.18

Records marked are interpolated. Seasons cover periods from July 1 to June 30 inclusive.

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Cate Ditch Co. vs. Whittier Water Co.

Table No. 3

Seasonal precipitation at Mt. Lowe, Los Angeles County, California, for 36 seasons from 1877-88 to 1912-13 inclusive. F.C. Finkle, Cons. Engr.

April 1914 Elevation 3420'

Season	Precipitation in inches
1877-78	43.52
1878-79	19.08
1879-80	41.10
1880-81	22.60
1881-82	17.48
1882-83	20.50
1883-84	87.37
1884-85	15.61
1885-86	46.35
1886-87	24.78
1887-88	24.31
1888-89	38.37
1889-90	78.88
1890-91	23.03
1891-92	20.02
1892-93	56.61
1893-94	12.48
1894-95	29.90
1895-96	14.63
1896-97	27.93
1897-98	13.62
1898-99	10.72
1899-00	26.02
1900-01	34.11
1901-02	18.77
1902-03	38.40
1903-04	14.91
1904-05	36.94
1905-06	36.89
1906-07	40.51
1907-08	21.35
1908-09	41.04
1909-10	30.95
1910-11	15.88
1911-12	15.88
1912-13	20.95

Mean 30.47

Records marked are interpolated. Seasons cover periods from July 1 to June 30, inclusive.

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Cate Ditch Co. vs. Whittier Water Co.

Table No. 4

Seasonal precipitation at Glendora, Los Angeles County, California for 36 seasons from 1877-78 to 1912-13 inclusive. F. C. Finkle, Cons. Engr.

April 1914 Elevation 740'

Season	Precipitation in inches
1877-78	33.80
1878-79	16.01
1879-80	31.98
1880-81	18.95
1881-82	14.65
1882-83	17.25
1883-84	64.26
1884-85	13.05
1885-86	35.63
1886-87	20.58
1887-88	20.19
1888-89	30.09
1889-90	58.48
1890-91	19.26
1891-92	16.85
1992-93	39.27
1893-94	9.98
1894-95	24.23
1895-96	12.94
1896-97	22.23
1897-98	10.38
1898-99	6.39
1899-00	11.28
1900-01	24.58
1901-02	15.00
1902-03	30.12
1903-04	12.40
1904-05	26.39
1905-06	27.03
1906-07	33.07
1907-08	17.39
1908-09	29.40
1909-10	17.78
1910-11	28.30
1911-12	12.22
1912-13	19.43
Mean	23.36

Records marked are interpolated
Seasons cover periods from July 1 to June 30, inclusive.

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Cate Ditch Co. vs. Whittier Water Co.

Table No. 5

Seasonal precipitation at Pomona, Los Angeles County, California for 36 seasons, from 1877-78 to 1912-13 inclusive. F. C. Finkle, Cons. Engr.

April 1914 Elevation 850'

Season	Precipitation in inches
1877-78	26.12
1878-79	16.02
1879-80	25.06
1880-81	16.63
1881-82	13.50
1882-83	15.48
1883-84	39.77
1884-85	10.57
1885-86	23.49
1886-87	13.33
1887-88	21.84
1888-89	23.35
1889-90	28.75
1890-91	81.86
1891-92	14.66
1892-93	29.08
1893-94	12.70
1894-95	26.68
1895-96	10.15
1896-97	22.17
1897-98	11.18
1898-99	7.77
1899-00	11.75
1900-01	21.19
1901-02	13.44
1902-03	19.92
1903-04	10.31
1904-05	26.45
1905-06	23.33
1906-07	28.96
1907-08	16.53
1908-09	24.00
1909-10	16.10
1910-11	20.18
1911-12	11.39
1912-13	17.00

Mean 19.23

Records marked are interpolated
Seasons cover periods from July 1 to June 30, inclusive.

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Cate Ditch Co. vs. Whittier Water Co.

Table No. 6

Seasonal precipitation at Ontario Power House, San Bernardino County, Calif. for 36 seasons from 1877-78 to 1912-13 inclusive. F. C. Finkle, Cons. Engineer

April 1914 Elevation 2380'

Season	Precipitation in inches
1877-78	38.75
1878-79	19.69
1879-80	39.75
1880-81	23.10
1881-82	19.70
1882-83	16.27
1883-84	75.59
1884-85	18.65
1885-86	43.00
1886-87	24.90
1887-88	32.36
1888-89	40.51
1889-90	40.51
1890-91	33.00
1891-92	24.55
1892-93	37.65
1893-94	14.90
1894-95	40.62
1895-96	14.95
1896-97	27.75
1897-98	15.05
1899-00	15.49
1900-01	31.25
1901-02	19.20
1902-03	34.73
1903-04	18.04
1904-05	33.02
1905-06	39.64
1906-07	39.21
1907-08	23.58
1908-09	37.88
1909-10	26.91
1910-11	37.00
1911-12	25.00
1912-13	19.30

Mean 29.40

Records marked are interpolated
Interpolations figured by comparison with San Bernardino
Seasons cover period from July 1 to June 30 inclusive.

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Cate Ditch Co. vs. Whittier Water Co.

Table No. 7

Seasonal precipitation at 22nd St., Ontario, San Bernardino County, Calif. for 36 seasons from 1877-78 to 1912-13 inclusive. P. C. Finkle, Cons. Engr.

April 1914 Elevation 1700'

Season	Precipitation in inches
1877-78	30.09
1878-79	14.72
1879-80	30.15
1880-81	17.12
1881-82	14.70
1882-83	12.45
1883-84	63.01
1884-85	13.98
1885-86	34.10
1886-87	18.55
1887-88	24.30
1888-89	31.95
1889-90	43.04
1890-91	24.98
1891-92	10.05
1892-93	33.23
1893-94	13.47
1894-95	27.87
1895-96	12.51
1896-97	25.52
1897-98	12.50
1898-99	8.15
1899-00	13.16
1900-01	23.55
1901-02	14.10
1902-03	24.38
1903-04	13.47
1904-05	30.72
1905-06	30.01
1906-07	30.70
1907-08	18.24
1908-09	26.76
1909-10	20.11
1910-11	26.65
1911-12	19.14
1912-13	14.55

Mean 22.75 Compared with San Bernardino

Records marked are interpolated.
Season covers period from July 1 to June 30 inclusive.

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Cate Ditch Co. vs. Whittier Water Co.

Table No. 8

Seasonal precipitation at Mt. Wilson Los Angeles County, California, for 36 seasons from 1877-78 to 1912-13 inclusive. F. C. Finkle Cons. Engr.

Elevation 6000'

Season	Precipitation in inches
1877-78	48.25
1878-79	22.90
1879-80	45.80
1880-81	26.77
1881-82	21.19
1882-83	19.23
1883-84	90.00
1884-85	19.23
1885-86	51.00
1886-87	29.08
1887-88	26.62
1888-89	42.03
1889-90	83.20
1890-91	27.28
1891-92	23.97
1892-93	61.40
1893-94	15.90
1894-95	34.57
1895-96	18.22
1896-97	36.58
1897-98	16.30
1898-99	14.67
1899-00	17.38
1900-01	35.02
1901-02	21.58
1902-03	43.06
1903-04	18.50
1904-05	39.90
1905-06	44.30
1906-07	44.02
1907-08	31.83
1908-09	41.56
1909-10	24.23
1910-11	21.61
1911-12	26.96
1912-13	21.32

Mean 33.82

Records marked are interpolated.
Season covers periods from July 1, to June 30 inclusive.

199 Cates Ditch Co. vs. Whittier Water Co.

Table No. 9

Seasonal precipitation at Clairmont and Los Angeles, Los Angeles County, California for 36 seasons from 1877-78 to 1912-13 inclusive. P. C. Finkle Cons. Engineer

April 1914

Season	Precipitation in inches
1877-78	24.08
1878-79	12.57
1879-80	32.78
1880-81	14.52
1881-82	18.63
1882-83	13.37
1883-84	43.77
1884-85	10.50
1885-86	25.14
1886-87	15.42
1887-88	15.23
1888-89	21.50
1889-90	40.04
1890-91	14.15
1891-92	12.71
1892-93	25.78
1893-94	8.75
1894-95	20.26
1895-96	9.05
1896-97	20.00
1897-98	9.05
1898-99	6.72
1899-00	9.28
1900-01	18.65
1901-02	11.52
1902-03	19.06
1903-04	9.80
1904-05	21.13
1905-06	20.15
1906-07	22.79
1907-08	13.66
1908-09	20.73
1909-10	14.90
1910-11	16.38
1911-12	12.83
1912-13	13.35
Mean	17.70

Seasons cover periods from July 1 to June 30, inclusive.

200 Cates Ditch Co. vs. Whittier Water Co.

Table No. 10

Mean precipitation on the San Gabriel River Watershed above the Paso de Bartolo
F. C. Finkle, Cons. Engineer April 1914

Division	Area in sq. mi.	Mean Precipitation	Product of the mean precipitation and the area
Valley Area Ele. 200-1500	183.87	16.70	3070.6290
Low Hills Ele. 250-1380	61.16	17.69	1081.9204
Area Between 600 and 2000	52.49	20.60	1081.2940
Ditto for 2000 and 3000	75.55	27.80	2100.2900
Ditto for 3000 and 4000	67.47	33.80	2280.4860
Ditto for 4000 and 5000	51.49	39.80	2067.2120
Ditto for 5000 and 6000	33.90	45.80	1520.5600
Ditto for 6000 and 7000	24.91	41.80	1041.2380
Ditto for 7000 and 8000	15.92	37.80	581.7420
Area between over 8000	6.22	33.80	210.2360
Total	572.20		
Mean	26.28		

201 Cates Ditch Co. vs. Whittier Water Co.

Table No. 11

Mean precipitation on the San Gabriel River watershed above Paso de Bartolo
F. C. Finkle, Cons. Engineer, April 1914

572.20 Square miles

Season	Precipitation in inches
1877-78	37.85
1878-79	17.38
1879-80	35.82
1880-81	20.42
1881-82	15.90
1882-83	18.65
1883-84	77.00
1884-85	14.21
1885-86	40.07
1886-87	22.28
1887-88	21.75
1888-89	33.58
1889-90	67.00
1890-91	20.88
1891-92	18.20
1892-93	48.63
1893-94	11.17
1894-95	26.62
1895-96	13.27
1896-97	28.25
1897-98	11.53
1898-99	10.00
1899-00	12.50
1900-01	27.03
1901-02	16.20
1902-03	33.60
1903-04	13.58
1904-05	34.03
1905-06	32.20
1906-07	33.60
1907-08	17.96
1908-09	33.23
1909-10	19.65
1910-11	26.78
1911-12	13.40
1912-13	21.03

Mean 26.29

Computed from the curve with Los Angeles

202 Cates Ditch Co. vs. Whittier Water Co.

Table No. 12

Mean precipitation on the Valley and low hills of the San Gabriel Watershed above Paso de Bartolo F. C. Finkle, Cons. Engr.

April 1914

Season	Precipitation in inches
1877-78	24.22
1878-79	11.12
1879-80	22.92
1880-81	13.07
1881-82	12.18
1882-83	11.94
1883-84	49.28
1884-85	9.09
1885-86	25.64
1886-87	14.26
1887-88	14.05
1888-89	21.49
1889-90	42.88
1890-91	13.36
1891-92	11.65
1892-93	31.12
1893-94	7.15
1894-95	17.04
1895-96	8.49
1896-97	18.08
1897-98	7.37
1898-99	6.40
1899-00	8.00
1900-01	17.30
1901-02	10.37
1902-03	21.50
1903-04	8.69
1904-05	21.78
1905-06	20.61
1906-07	21.50
1907-08	11.49
1908-09	21.29
1909-10	12.57
1910-11	17.14
1911-12	8.58
1912-13	13.46

Mean 16.83

Seasons cover periods from July 1 to June 30, inclusive.

203 Cates Ditch Co. vs. Whittier Water Co.

Table No. 13

Mean seasonal run-off in Ann. sec. ft. from the Valley and low hills area of the San Gabriel Watershed, above Paso de Bartolo. F. C. Finkle, Cons. Engr.

April 1914 249.05 sq. miles

Season	Run-off per sq. mi. Ann. sec. ft.	Total run-off in Ann. sec. ft.
1877-78	0.302	74.00
1878-79	0.008	1.96
1879-80	0.257	62.79
1880-81	0.026	6.37
1881-82	0.019	4.66
1882-83	0.017	4.17
1883-84	1.723	422.19
1884-85	0	0
1885-86	0.360	88.21
1886-87	0.044	10.78
1887-88	0.040	9.80
1888-89	0.209	51.21
1889-90	1.310	320.99
1890-91	0.032	7.84
1891-92	0.009	2.21
1892-93	0.615	150.69
1893-94	0	0
1894-95	0.096	23.52
1895-96	0	0
1896-97	0.120	29.40
1897-98	0	0
1898-99	0	0
1899-00	0	0
1900-01	0.100	24.50
1901-02	0.002	0.49
1902-03	0.208	50.97
1903-04	0	0
1904-05	0.218	53.42
1905-06	0.181	44.35
1906-07	0.208	30.97
1907-08	0.004	0.98
1908-09	0.204	49.99
1909-10	0.021	5.15
1910-11	0.097	23.77
1911-12	0	0
1912-13	0.032	7.84
Mean	0.180	43.71

Taken from the Newell Curve

204 Cates Ditch Co. vs. Whittier Water Co.

Table No. 14

Mean seasonal run-off in inches under a 4" pressure from the Valley and low hills areas of the San Gabriel watershed above Paso de Bartolo. F. C. Finkle, Cons. Engr.

April 1914 50 inches 1 sec. ft.

Season	Total runn-off in inches under a 4" pressure
1877-78	3,700.0
1878-79	98.0
1879-80	3,148.5
1880-81	318.5
1881-82	233.0
1882-83	208.5
1883-84	21,109.5
1884-85	0
1885-86	4,410.5
1886-87	539.0
1887-88	490.0
1888-89	2,560.5
1889-90	16,049.5
1890-91	392.0
1891-92	110.5
1892-93	7,534.5
1893-94	0
1894-95	1,176.0
1895-96	0
1896-97	1,470.0
1897-98	0
1898-99	0
1899-00	0
1900-01	1,225.0
1901-02	24.5
1902-03	2,548.5
1903-04	0
1904-05	2,671.0
1905-06	2,217.5
1906-07	2,548.5
1907-08	49.0
1908-09	2,499.5
1909-10	257.5
1910-11	1,188.5
1911-12	0
1912-13	392.0
Mean	2,196.0

Seasons cover periods from July 1 to June 30, inclusive.

Cate Ditch Co. vs. Whittier Water Col

Table No. 15

Mean precipitation on the mountainous area of the San Gabriel River Watershed above Paso de Bartolo. P. C. Finkle, Cons. Engineer. April 1914

Season	Precipitation in inches
1877-78	47.69
1878-79	21.90
1879-80	45.13
1880-81	25.73
1881-82	20.03
1882-83	23.50
1883-84	97.02
1884-85	17.90
1885-86	50.49
1886-87	28.07
1887-88	27.66
1888-89	42.31
1889-90	84.42
1890-91	26.31
1891-92	22.93
1892-93	61.27
1893-94	14.07
1894-95	33.54
1895-96	16.72
1896.97	35.60
1897-98	14.53
1898-99	12.60
1899-00	15.75
1900-01	33.06
1901-02	30.41
1902-03	42.34
1903-04	17.11
1904-05	42.88
1905-06	40.57
1906-07	42.34
1907-08	22.63
1908-09	41.87
1909-10	24.76
1910-11	33.74
1911-12	16.88
1912-13	26.50
Mean	33.27

Seasons cover periods from July 1 to June 30, inclusive.

206 Cate Ditch Co. vs. Whittier Water Co.

Table No. 16

Mean seasonal run-off in Ann. sec. ft. from the mountainous area of the San Gabriel Watershed above Paso de Bartolo.
F. C. Finkle, Cons. Engineer.

April 1914 327.17 square miles

Season	Rainfall per sq. mi. Ann. Sec. Ft.	Total run-off in Ann. Sec. Ft.
1877-78	2,160	711.69
1878-79	0,472	154.42
1879-80	1,980	647.80
1880-81	0,682	223.13
1881-82	0,383	125.31
1882-83	0,555	181.58
1883-84	5,620	1838.70
1884-85	0,288	94.22
1885-86	2,356	770.81
1886-87	0,823	269.26
1887-88	0,798	261.08
1888-89	2,783	583.34
1889-90	4,720	1544.24
1890-91	0,718	234.91
1891-92	0,524	171.44
1892-93	3,080	1007.68
1893-94	0,162	53.00
1894-95	1,182	386.71
1895-96	0,247	80.81
1896-97	1,320	431.36
1897-98	0,178	58.24
1898-99	0,120	39.26
1899-00	0,217	71.00
1900-01	1,148	375.59
1901-02	0,977	319.65
1902-03	1,782	583.02
1903-04	0,262	85.72
1904-05	1,822	596.10
1905-06	1,660	543.10
1906-07	1,783	558.90
1907-08	0,509	166.53
1908-09	1,756	574.51
1909-10	0,623	203.83
1910-11	1,195	398.97
1911-12	0,259	84.74
1912-13	0,724	235.87
Mean	1,246	407.22

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Cate Ditch Co. vs. Whittier Water Co.

Table No. 17

Mean seasonal run-off in inches under a 4" pressure from the mountainous area of the San Gabriel River Watershed above Paso de Bartolo. F. C. Finkle, Cons. Engineer.

April, 1914 50 inches 1 sec. foot

Season	Total run-off in inches under 4" pressure
1877-78	35,584
1878-79	7,721
1879-80	32,390
1880-81	11,156
1881-82	6,266
1882-83	9,079
1883-84	91,935
1884-85	4,711
1885-86	38,540
1886-87	13,413
1887-88	13,054
1888-89	29,167
1889-90	77.212
1890-91	11,776
1891-92	8,572
1892-93	50,384
1893-94	2,650
1894-95	19,338
1895-96	4,040
1896-97	21,593
1897-98	2,912
1898-99	1,963
1899-00	3,550
1900-01	18,780
1901-02	15,982
1902-03	29,651
1903-04	4,286
1904-05	29,805
1905-06	27,155
1906-07	27,945
1907-08	8,326
1908-09	28,726
1909-10	10,191
1910-11	19,548
1911-12	4,237
1912-13	11,844
Mean	20,361

to 5 feet per day. It seemed useless to go further, as we had a good supply of water and did not know how thick the clay strata was.

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210
Cates Ditch Co. vs. Whittier Water Co.
Table 18

Mean seasonal run-off from the entire San Gabriel Water shed above the Paso de Bartolo in inches under a 4" pressure.
F. C. Finkle, Consulting Engineer, April, 1914. 572.2 square miles

Season	Total run-off in inches under a 4" pressure
1877-78	39,284.0
1878-79	7,819.0
1879-80	35,538.5
1880-81	11,474.5
1881-82	6,499.0
1882-83	9,287.5
1883-84	113,044.5
1884-85	4,711.0
1885-86	42,950.5
1886-87	13,952.0
1887-88	13,944.0
1888-89	31,727.5
1889-90	93,261.5
1890-91	12,138.0
1891-92	8,682.3
1892-93	57,918.5
1893-94	2,650.0
1894-95	20,512.0
1895-96	4,040.0
1896-97	23,063.0
1897-98	3,912.0
1898-99	1,963.0
1899-00	3,350.0
1900-01	20,005.0
1901-02	16,006.5
1902-03	32,199.5
1903-04	4,286.0
1904-05	32,476.0
1905-06	29,372.5
1906-07	30,493.5
1907-08	8,375.0
1908-09	31,225.5
1909-10	10,448.5
1910-11	20,736.5
1911-12	4,237.0
1912-13	12,236.0
Mean	22,572.8

50 inches 1 cu. ft. per sec.

212

Table No. 22

Summary of water diverted by Cate Ditch for irrigation season of 1912, after July 31, 1912, based on Tables No. 1 to 5 inclusive.

Month	Main discharge of Ditch in inches under a 4" pressure
August	328.25
September	360.86
October	288.00
November	336.00
December	493.00
Mean flow for five months	361.22

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213

Table No. 23

Summary of water diverted by the Standefer Ditch for irrigation season of 1912, after July 31, 1912, based on Tables No. 6 to 10 inclusive.

Month	Mean discharge of Ditch in inches under a 4" pressure
August	1246.00
September	1185.00
October	842.50
November	922.50
December	1000.00
Mean continuous flow for five months	1039.16

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213

Table No. 24

Summary of water diverted by Los Nietos Ditch for the irrigation season of 1912 after July 31, 1912, based on Tables No. 11 to 14 inclusive.

Month	Mean discharge of Ditch in inches under a 4" pressure
August	1111.40
September	1227.00
October	Not reported
November	2029.70
December	2030.30
Probable mean continuous flow for 5 months	1599.82

214

Table No. 25

Summary of water diverted by Little Lake Ditch for irrigation season of 1912 after July 31, 1912, based on tables 16 to 20 inclusive.

Months	Mean discharge of Ditch in inches under a 4" pressure
August	17.42
September	301.00
October	1014.39
November	1120.80
December	763.00
Mean continuous flow for five months	643.32

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214

Table No. 26

Total water supply of lower San Gabriel River, diverted and used by the Ditches, from intake of Cate Ditch down stream, for the last five months of 1912, in inches continuous flow, measured under a four inch pressure.

NAME OF DITCH	QUANTITY
Cate Ditch	361.22
Standifer Ditch	1039.16
Los Nietos Ditch	1599.82
Little Lake Ditch	643.32
Total - - - -	3643.52

215

Table No. 29

Summary of water diverted by Cate Ditch during 1913. Irrigation season based on Tables No. 1 to 7 inclusive.

Month	Mean discharge in inches under a 4" pressure
May	450.00
June	353.00
July	379.00
August	450.00
September	481.00
October	191.00
November	62.00
Mean - - - - - -	338.00

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215

Table No. 30

Summary of water diverted by Los Nietos Ditch during the 1913 irrigation season based on tables 8 to 14 inclusive.

Month	Mean discharge in inches under a 4" pressure
May	1566.00
June	1784.00
July	1784.00
August	1474.00
September	1432.00
October	984.00
November	1063.00
Mean - - - - -	1431.00

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215

Table No. 31

Summary of water diverted by Standifer Ditch during the 1913 irrigation season based on tables No. 13 to 21 inclusive.

Month	Mean discharge in inches under a 4" pressure
May	1115.00
June	1531.00
July	1852.00
August	1566.00
September	1395.00
October	908.00
November	906.00
Mean - - - - -	1324.71

216

Table No. 32

Summary of water diverted by Little Lake Ditch during irrigation season of 1913, based on Tables 22 to 28 inclusive.

Month	Mean discharge in inches under a 4" pressure
May	766.00
June	514.00
July	53.00
August	135.00
September	17.70
October	123.00
November	376.00
Mean	283.53

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216

Table No. 33

Total Water supply of lower San Gabriel river diverted and used beneficially by the various Ditches, from intake of Cate Ditch down stream during 1913 irrigation season, expressed in inches continuous flow under a four inch pressure.

NAME OF DITCH	QUANTITY
Cate Ditch	333.00
Los Nietos	1431.00
Standefer Ditch	1324.71
Little Lake Ditch	283.53
Total	3377.24

217
T. W. Watson, Glendale

Mr. Watson was seen at City Hall in Glendale, Sept. 24, 1914, by R. A. Borthick.

He says he came to Glendale in 1883 with his folks; was a small boy about seven years old in the 1883-84 flood, but can remember about the big water and they were living about a mile from the Verdugo canyon, and he sayd they could hear the water roar at their place. The Verdugo wash was running very nearly down the center of the canyon at that time or about where Canada Boulevard is at the present time. He says the Verdugo wash has filled up considerably at the mouth of the canyon in the last twenty years, filled some five or six feet in the bed of the stream near the Rose Packing House in 1914 flood. In the 1884 flood there was much more water and it spread much worse down toward San Fernando road than in 1914. The wash as a whole filled up a great deal in the 1914 flood and there is not much of a bed left for the water. In places the bed of the stream is higher then the surrounding property. In 1889 there was another large flood and the people had to build a dam or builkhead at the intersection of Glendale Ave. and Verdugo road to keep the water from going down Glendale Ave. Some of the water did go down Glendale Ave.

In 1892-93 there were big rains and he remembers pretty well what section in the north end of the country was overflowed because he was driving a butcher wagon in the Burbank and Lankersheim district. He says the district between Burbank and Lankersheim was badly flooded in places and some of the big washes between Burbank and Lankersheim were made at that time, and the section of country where Van Nuys is, was all under water in 1892-93.

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218
W. T. Dalton, 1000 Lake St., Los Angeles

Was seen at his home, 1000 Lake St., Los Angeles, by R. A. Borthick, September 27, 1914. Says he came to Los Angeles county in 1851 with his father and stopped at Azusa. There was a big flood in 1861-62 but he was young and did not remember much about what part of the country was flooded, but he remembers there was a great deal of flood water all over the lowlands of the country. In 1867-68 was the year the New river was formed and there was a great deal of country down by where it runs at the present time that was covered with water. In1884 there was a very large flood and he remembers it better than any of the other floods. He was building a house and it commenced to rain and did not stop for about six weeks and the lumber got so wet and swelled so that when it dried out he could stick his finger through the cracks. He says the people down in the southwestern section of Los Angeles where the Los Angeles Investment Company cut up a large tract of ground a__ built houses and sold them, were talking about trying to get damages from the city of Los Angeles because they were flooded with water in the 1914 flood, a part of what was known as the Cienega country, and

he says he has seen that whole section belly deep to a horse and there used to be sloughs all through the Cienega country. The city is putting in a lot of big drain pipes in the Westlake district to help relieve that section of country which is low, southwest of the Westlake district, but he doubts if they will do much good as that section of the country is very low and damp whenever the country gets wet, and if they have another rain such as 1884 he knows it will flood the southwestern section of the city.

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218
C. C. Mason, Santa Fe Springs

Was seen at his home ranch at Santa Fe springs, September 29, 1914, by R. A. Borthick. Says he lived in this section for 38 years and the 1884 flood was the largest in his time, and the water got the highest and did more damage than any time in the last 38 years. He says the most of the damage was done in the river bed very nearly as far down as Artesia. By river bed he means from the Ten Mile House to New river. Down near Artesia and below that the section of the country was a lake. They had to do considerable work in 1884 about a mile above Los Nietos to keep the New River from going down the Canada Verda, which he thinks was originally the old river bed. Would not undertake to say how long since it was the river bed, but the signs go to show it was originally a large water course and if you dig in it, will find river sand.

He says an old Mexican man told him when he first came here that 65 years before that time, or about 1812, the San Gabriel river was running against the bank near Santa Fe Springs and the bank or swale shows very plainly at the present time. Commences about a mile westerly of Los Neitos and along the westerly side of the S.P. R. R. branch from Whittier and crosses the R. R. about Santa Fe Springs. The bank of this swale is very plain and abrupt near Santa Fe Springs some ten to twenty feet rise in about forty or fifty feet distance. He does not remember many of the Mexicans but says he was an old man and a very intelligent man.

Mr. Mason says there was a lot of surveying and estimating done about 1885 or when Venerable was on the Board of Supervisors, he can't remember exact figures of the report but the protection of New River alone run up into the millions and it was dropped and nothing ever done. Mr. Mason thinks it is absolutely impracticable to try to confine and control the rivers. Says he has seen the New River in 1884 when it was carrying more water than the Ohio river does at good boating stage, and the waves were so high that you could stand on one bank and could not see the other bank. Waves were from four to six feet high. In the 1884 flood he has seen the water come out of the canyon over near East Whittier in lakes of water, in other words there would be a sheet of water 100 acres in extent come down across the country.

In 1887 the people interested in the Santa ditch spent about $,000 up above the Pico bridge to protect the head of their ditch for about six hundred or seven hundred feet with piling and wire and

when a freshet came it took it just about thirty minutes to take it all out. He was not up there when it went out, but Eli King was and told him about it. And he says the protection was well built and if $3,000 will not protect six or seven hundred feet, it will be very expensive to try to protect the whole distance from sea to foothills. He says the rivers are all a mass of moving sand and there is nothing solid to anchor to. When they put the Santa bridge in across New River they had to dig as far as they could until the water stopped them and then they put inpumps and when down as far as they could and then drove piling and built their piers on them and they have stood. He does not think there was any comparison between the 1884 flood and the 1914 flood. He doubts if a rightway a half wile wide would have carried the 1884 waters.

In the 1884 flood it was five or six weeks before there was any railroad communication with the city of Los Angeles. The only way they had of crossing the river was to coon the railroad, that is, the bridge of the railroad was washed out but the rails were holding from the ties and fish plates and one rail was sagged down much worse than the other, just missed the water a little and they would walk on that one and hold to the other one. The country even up on the Mesa got so wet that if your team got off the beaten track you would bog down.

The high or mesaground in the section where he lives has never been flooded. He says they talk about State and Federal help, but he cannot see how they are going to get much State help anyway, for he has visited several counties that have had the flood water in 1914 and they claim they have as much right to State help as Los Angeles County, and if the state goes to help everybody, she will be up against it.

He thinks there could be a lot of work done that would be of a great deal of value by keeping the beds of the streams clean of willows and debris, and straightening and opening up channel in places. But as for buying a rightway and protecting the streams from the sea to the mountains, it looks very foolish to him and more like a job for the engineers than anything else.

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221
Tom Sanchez, Los Neitos

Was seen at his home at Los Neitos, September 29, 1914 by R. A. Borthick.

Was born in old Sanchez home on the banks of the Rio Hondo near where Montebello is at the present time in 1858. Says he was too young to remember anything about 1861-62 flood but has often heard his folks talk about how high the waters got up on the banks of the Rio Hondo over near his old home and according to what they told him the waters were much higher at that time than they have ever gotten since. He says in the 1867-68 flood was when the New River was formed he was still a small boy but he remembers that they had to take out several people down near Pico over to the bluff on

the Montebello side. After New River broke out practically all the water went that way in the 1867-68 flood and the majority of it has continued to go that way up to about 1891-92. Then the water of the San Gabriel canyon commenced running over on the other side or down the Rio Hondo down through El Monte, came over up near Duarte, and has continued to get more and more of the San Gabriel canyon water until at the present time it gets the most of it.

He says the overflow in 1867-68 and 1884 were both much larger and there was a great deal more country covered with water but there was not nearly so much damage as in 1914 because the water was not confined so much by railroad and bridges and just spread all over the country and there was not as much to damage as at the present time. Very little of the country was settled up and very little of it being cultivated even in 1884. He says Canada Verda starts about his place, which is just a little east of Los Neitos and runs off down south and a little east, down close to Westminister and goes into Coyote Creek. It used to have water in it the year around and was swampy. The people used to call it the swamps and in the wet season it carried lots of water. No water there now only when it rains. There is another slough that starts at Stanford ranch west of Los Neitos and runs off down through the country near Santa Fe Springs and on down through Norwalk and Artesia and drained what was known as Little Lake. The lake is dried up now since they have been pumping in this section, and there is water there now only in the wet winter season. He says some of the people claim New river very nearly got into this slough or swale in the 1884 flood, and they claim some of the river water did go down there. He thinks the river should be taken care of, and that is, opened up and given a clear wide channel free from turns and all willows, brush and other debris in the channel of the stream, and it will take care of itself. The pile bridges of railroads and county roads are the cause of most of the damage.

He had no overflow on his property in the 1914 flood.

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222
W. Eyers, Tropico.

Was seen at his shoe repairing shop on Hill St., Los Angeles October 1, 1914, by R. A. Borthick.

He says he went to Tropico in February, 1884, and has lived there ever since. When they were taking the furniture out of the wagon, it commenced to rain and rained so hard for three days and nights that they could hardly get out of the house. It rained 40 inches by June, and the ground was so well soaked with water that he planted a crop of corn and it matured without irrigation. This was in June. On February 20, 1884 it took 20 houses down the Los Angeles river in Los Angeles in one night. It also took out the ditch for the Los Angeles water supply west of the Los Angeles river about opposite Tropico, and caused the S. P. R. R. tunnel above San Fernando to cave and washed two or three miles of track out between

Roscoe and San Fernando, and there were no trains from the north until sometime in March. It took all the bridges in the County out with the exception of one or two.

He says the Arroyo Seco was running very nearly bank full until June. Says 1884 was the greatest growing year he ever knew of. Says he saw crops of barley planted and harvested and then the ground broke and crops of pumpkins planted and a big crop raised without any irrigation. He had apricot trees that made eleven foot growth that season.

The whole lower section of Los Angeles was a lake in 1884. There was no particular damage done in the Glendale or Tropico district in 1884. There was just lots of water but did not do much cutting. The Los Angeles river got much higher in 1884 than in 1914.

He thinks 1889-90 floods and the 1914 flood were about the same size. The year following the 1884 flood was a very dry year.

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223
Fred Sanclair, Glendale

Was seen at the corner of Brand Bldv. and Broadway, Glendale, October 2, 1914, by R. A. Borthick.

Says he came to Glendale in 1885 and has been there ever since. There was a flood in 1889-90 that was much larger than the 1914 flood. Again in 1892-93 there were big rains and the Van Nuys and Lankersheim country was much worse flooded than in 1914. The washes between Burbank and Lankershein were cut out and washed much worse than they were prior to that time. Were made much wider than they were before.

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224
John Todd, Glendale.

Was seen at his home on West Fourth St., Glendale, October 3, 1914, by R. A. Borthick. Says he was in Compton district from 1875 to 1887 and lived about a mile east of Long Beach Blvd. and between Lugo School house and Compton. When his father built his house he built it right in what was the Los Angeles river bed before the 1868 flood, but when the water left the old channel it left it higher than the surrounding country. When they first went there the Los Angeles river was running about one-quarter mile east of where they built their house and across the back end of their property.

In 1884 the whole country was flooded, the river was three or four miles wide and the Compton and Clearwater section was all under water. He says the country in that section would overflow more or less every time there were any rains to speak of, and that it did not damage, would not wash and just spread out over the land,

was considered a benefit to the ground. Would drown the gophers and the sediment enriched the ground. He says there was a ditch dug in the early times by the soldiers at Wilmington. It commenced up about opposite Downey and came down across the country and went across the end of his father's place and on down to Wilmington to carry water for the fort and the water would usually follow this ditch only in heavy flood times and then it would spread all over the flat country.

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225
Mr. Fisher, Burbank

Was seen at his office in Burbank, October 2, 1914 by R. A. Borthick.

Says he came to Burbank in 1877 with his folks and he thinks that the 1884 flood was the largest flood by considerable that has happened since he was in the country. The 1889-90 flood did more damage and washed away more ground than in 1914, but the ground was not of as much value at that time. There were washes between Burbank and Lankersheim before the 1884 flood but they were made much larger in 1884 and 1889 floods. There were three houses washed away in the 1889 flood in the wash that lays the closest to Lankersheim.

Says he has seen the Van Nuys country much worse flooded in 1889 flood than it was flooded in 1914. He would not say as to the 1884 flood, did not remember for he was pretty much of a boy.

He thinks it would be a great thing if the waters could be controlled and does not see why they cannot be controlled. Says if the City of Los Angeles would clean out the channel of the Los Angeles river to a width of 100 feet, take the willows and brush out, it would carry the water. Before the flood of 1914 the channel was choked up to a width of about 25 or 30 feet, and the city would not clean it out or allow any one else to do any work in it.

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225
G. B. Woodberry, Glendale,

Was seen on Brand Bldv. in front of the Post Office, October 2, 1913, by R. A. Borthick. Says he came to Glendale in November, 1884 after the big flood of 1883-84 and cannot say what was done in that flood. But there were big rains in 1887 and 1889-90 and he thinks the 1889-90 flood the biggest of his time. The Verdugo wash has been in about the same place with the exception of a few small changes since he has been here. Says he has seen the Verdugo wash do a great deal of damage. In 1889-90 Judge Ross had quite a lot of orange trees washed out and the wash up above the Verdugo ranch house switched across the canyon and cut out a new channel and spoilt a lot of ground.

The whole mouth of the canyon has filled up considerably in the last few years and it filled some three or four feet in 1914 flood. The bed of the stream in someplaces, especially near the Thorn Packing House is three or four feet higher than the surrounding property, and all that kept the wash from going out down through Glendale and Tropico was the amount of sand hauled from the wash for road and building purposes.

In 1889 the people of Glendale had to build a bulkhead up at the intersection of Glendale and Verdugo Road to keep the water from going down Verdugo Road, would have gone down through Fourth St. School and on down through Tropico.

Mr. Woodberry says he was up about where Geneva St would intersect and he came very near losing his life. The water came in a large wave and broke out just about where he was standing and knocked him off his feet and rolled him over two or three times and he had a hard time getting out. He says if it had kept coming like it started and had not turned back, there would not have been much of Glendale and Tropico business center left. Mr. Woodberry thinks it would not be a very difficult job to take care of the Verdugo wash and protect it, if they could tell just how much the bed of the stream would scour, so they could put their bank protection down below where it scours too. But it is impossible to figure how deep it will scour if confined, or if it will scour at all, or fill, and a pile or tree is no protection unless it is at the base of the bank or down below the water level.

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226
John P. Watson

Lives on Lot 4 of Dominguez Colony Sub. just north of Willows Ave. and east of P. E. to Redondo. Has lived on this place and farmed it for three years, says he came very near pulling up and leaving just after the flood of 1914, but decided he would stay and see what he could do with what was left of the ranch.

Says there has been water there every year since he has been there, but done no damage until 1914 flood, and it cut great ditches in some places and in others washed the soil off and filled it up again with sand in places as much as three feet deep. Says this year's crop does not amount to much and estimates about twenty to forty acres of land ruined.

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227
Mr. Harnett

Mr. Harnett, 2481 Atlantic Ave., Long Beach, came to Florence in November, 1889 and came to 2481 Atlantic Ave., May 1890. He owns five acres of ground lying along Atlantic Ave., and running to Pasadena Ave and just westerly of the P. E. right of way to Newport.

He sayd that in 1889-90 the water came up over American Ave. and on up over Pasadena Ave. and got up on the lower edge of his property and in 1914 it did not cross American Ave. According to him he thinks there was more water in the easterly branch of the river but not so much in the westerly branch, and probably did not spread as bad, or do as much damage because there was not the same amount of improvements to damage.

Mr. Harnett says that the east branch of the Los Angeles river was called a slough before 1889 by a part of the people, he so considered it himself, and the west branch that empties into Wilmington the river.

Mr. Harnett and his boys helped to rescue livestock where Willows Station is now. That whole country was covered with willows at that time.

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227
I. Stewart, Ferris Road, Long Beach

Mr. Stewart has resided on Lot 12, Wilmington Colony Track for eleven years. His house faces on Ferris Road.

The first time his place was overflowed to his knowledge was in 1913. According to Mr. Stewart the water in 1913 was about 4" higher on his place in 1913 than in 1914, on account of the dams and ditches on the Dominguez Ranch. Mr. Stewart says he drilled a well farther over in the valley 912 feet deep, trying for Artesian water, the last water he got was 600 feet down and he did not get Artesian water, but the water comes to about 2 feet of the surface, and he says if he had the facilities he could pump 250 inches. Mr. Stewart has talked with George Bixby and others and would like to turn water out of San Pedro Bay into Alamitos Bay.

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228
Mr. Moulton, Ferris Road, Long Beach

Mr. Moulton came to Long Beach township in 1885, has lived there ever since. According to him there was more water in 1914 than he ever saw since he lived in the township. His place is set to alfalfa and the entire 80 acres was flooded, and more or less sand deposited on the ground.

Mr. Moulton says his place was never flooded since he was on it until 1913 and again in 1914. He attributes the 1913 flood to the ditches and dams on the Dominguez Ranch. He has been very much against their trying to form assessment districts and trying to take over the care of the water, but if it was taken hold of right, he says he would be very much in favor of it.

He has a pumping plant. Well is 180 feet deep, main watersand 85 to 130 feet.

He says the water was solid lake from P. E. tracks to Long Beach and over the rails of the P. E. tracks to Redondo as far as Nigger Slough. He says that now as the beds of the river are all filled up, no telling where the water will go if another flood would come. He says the water dried up and quit running in the beds of the streams before it did on the fields and orchards. Description of Prop: Rancho Los Cerritos--78.05 Acres (Inc. Rds) 80 acres beginning at N. E. corner Lot 4 of 1419 A tract of Rancho Los Cerritos. Thence W 20 chains Thence N 40 chains, thence N. E. 20 chains, thence S. 40 chains.

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229
J. E. Stewart, 139 E. 1st St., Long Beach

Mr. Stewart is a real estate man. He was living in San Gabriel in 1889 and in his opinion the 1914 flood was much the larger and did much more damage. He is very strong for doing anything that will in any way help to take care of floods and at the same time conserve the water if possible.

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229
Mr. W. R. Dodson, El Monte, Calif.

Was seen at his home in the city of El Monte November 14th by R. A. Borthick.

Says he came to El Monte in 1868 and bought the old Whistler place over on the west side of El Monte, and sowed about twenty-five acres to alfalfa in 1878. When he first came to El Monte he claims there was no sign of a wash where the west branch of the San Gabriel runs at the present time, and where there is a bridge now 1180 feet long. He claims the first time there was any wash there was in in 1887, and it cut a channel about 30 feet wide and 10 feet deep. There may have been water there before but it cut no channel.

In 1889 he had a house washed away and quite a piece of ground. The house stood just above where the bridge is now. He says the principal cause of the big water in 1889 in the west of El Monte branch of the San Gabriel river was on account of the people on the east or Bassett side of the San Gabriel turning the water over into the west branch.

He says sometime in about 1890 himself and others built a rock dam about half a mile above the Peck place, to keep the water over in the old or east channel of the San Gabriel. The dam was some 300 or 400 feet long, and about two to two and one-half feet high. He himself paid about 50 men for 2 or 3 days work, and he claims parties from down Downey way--the Scott people and Jim Durffy--came up and turned the water back into the west branch, and helped the water to tear down their dam. He claims their dam stopped the water from coming down the west side, and would have continued to do so if the other parties had left the water alone.

He says another time he had about twenty men working up there and 3 or 4 from the other side came to turn it back. Says he had a shot gun with him, and told his men to go ahead, and the other parties to beat it, and they beat it.

He says there has been more or less fighting and turning of water for the last thirty years; the people of the east side turning the water to the west side, and the people of the west side buiding dams and trying to keep it from ciming that way.

He says they had more water in the Rio Hondo at El Monte in 1914 than ever before. Says Davis, the rock quarry man, was mostly to blame; took all rocks out of the stream on this side of the Santa Fe for about a mile, and that naturally made the water run to the westerly, or El Monte side.

Says there were three people drowned this dide of the Santa Fe at Duarte in 1889.

Says in 1910 it washed a walnut grove away for him, and did an immense amount of damage above the road to San Bernardino; also washed the wagon bridge on the San Bernardino Road away. The bridge was 600 feet long at that time.

He says that a man by the name of Henry Roberts, now dead, told him that in the '67 flood that he lived down below the narrows, and the water very nearly stopped running, and it had been raining hard, and he took his gun and went up on the hills by the narrows to see what had stopped the water, and the water was blocked by logs and drift, and he says some 25 to 50 feet high, and backed up three or four miles, and he says when it went out it made a noise loud enough to be heard two or three miles, and broke logs four and five feet thick, and he claims that was what caused New River to go off from the San Gabriel channel.

Mr. Dodson says after the 1867 flood he hauled wood from one place below the Narrows for about two years. There was a patch of ground about two acres in size and from 6 to 20 feet deep with logs that had come down from the jam at the Narrows, and there were lots of logs as large as five feet in diameter that had been broken as if they were matches. He found a dead grizzley bear out in the center of the pile of logs after he had been hauling from the pile quite awhile. The skeleton of the bear and hide was all there, and he said it looked as if it had been caught in the flood, and tired to save himself by riding the drift wood. Anyway, he was there, and it showed he came down in the 1867 flood.

He says the San Gabriel canyon water belongs in the old river, or easterly branch of the San Gabriel, and thinks it should be put back there and kept there.

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Mr. J. D. Durffy, El Monte, Calif.

Was seen at his place on Durffy Road, about three miles south

of El Monte, September 4th, 1914, by R. A. Borthick.

Says he came to the place he lives on in November, 1860, and has been there ever since. Says in 1861-62 there was a big flood, and the water broke over above El Monte, and went down what was known as Lexington Wash. At that time Lexington Wash did not have the semblance of a river bed there; was a large swale above El Monte, and thick with willows and brush. The whole section down by El Monte as far as Savannah was under water, and down toward Old Mission; says you could not go from El Monte to Los Angeles would swim a horse, and the El Monte people had to go up stream two or three miles and cross where the water was not so deep, and then come back to the road over on the high ground; says he had to do that more than once. But the 1861-62 flood did not make any channel or do any washing except down below Old Mission settlement, and between Old Mission and El Monte.

He says before the 1867 flood, the Rio Hondo above Old Mission settlement was a live stream some 20 feet wide, and the water was clear and had cat fish in it. It got its supply of water from springs and several thousand acres of log, damp land between El Monte and Old Mission. The water stood on parts of this ground the year round, and the land was not used for any purpose, and was considered of no value, but that it has since all been drained and made fine ground. The wide wash that now runs through El Monte has been made by several floods, first commencing to wash down by the Old Mission settlement in 1867 and washing back further and wider every flood until it is a great waste or wash up through El Monte very nearly to Duarte, or where it comes out of the San Gabriel.

Says the 1862 flood did not do any washing to speak of, just spread out all over the country. The channels at the present time are anyway from five times as wide as they were in 1862. The channel of the San Gabriel did not amount to much above the Old Temple Place in 1860, where he lived at that time; you could cross it in places, and hardly tell where the bed of the stream was. The water in the floods as far back as 1862 always overflowed into Lexington Wash, and spread all over the country as far as Savannah. There was no channel to speak of, water just spread through willows and brush and stood on the ground; would swim a horse at Savannah, but never did any cutting until in the 80's that is up as far as El Monte; did come down around Old Mission settlement.

He thinks the biggest flood of his time was the one of 1867-68 when the water broke out of San Gavriel channel and formed New River. It broke out a little above Old Temple Place and continued south instead of making the turn over toward the point of hills just below Old Mission settlement, and all the water of San Gabriel went into New River; all the water of the San Gabriel canyon that has since flowed into the Rio Hondo, with the exception of a small amount of overflow in one or two of the big floods, has come by way of Lexington Wash, or up above El Monte near Duarte.

In the 1867 flood there was quite a lot of ground cut out on the Rio Hondo below Old Mission, and up against the bluff on the Old Mission side; says the road used to be down in the flat and

there was quite a lot of good ground, some in Vineyard between the bluff and the river, and most of it was washed out and they had to cut a new road along the side of the hill.

The San Gabriel is working one way or the other all the time and making curves. In 1862 the San Gabriel cut very nearly over to Durffy Road close to where he lives, and ran where the bank shows at the present time, and then went back to the other side 3/4 of a mile. In one flood--he doesn't remember what date--it cut its way within about 1/4 of a mile of where it would have gone into San Jose Creek, and then made a curve and doubled back on itself.

There was a large flood in 1884, and the whole country was a sheet of water; could not say as to what parts were under water, for he could not get out there.

In the 1867 flood there were thousands of cords of wood brought down from the canyon and scattered over the country. They were hundreds of teams hauling wood to Los Angeles and the other small towns for weeks. There was a small slough, or branch now filled up, just below his house, that was filled chuck full of cedar and hemlock logs, some as large as three feet in diameter, and he had wood for years.

He used to have a fine pasture on the east side of Durffy road, and there were several hundred acres out in 1867; it has since filled in and does not look as though it was ever a river bed. The bed is some 3/4 of a mile east of there at the present time, and the ground that was cut out and filled in again is very good ground; raises barley and oats on it.

When he drained his place he dug down about seven feet to put in his drains, and when the was down about four feet he came across a cottonwood log some three feet in diameter. The outside of the log was rotten to a certain extent, but the heart of the log was in good shape, and he had to cut out a section of it, about eight feet, to get his ditch in, as it lay angling across the ditch. There was no sign of sand or river bed anywhere; all was nice, rich black soil. He had a well dug just west of Artesia, and 100 or 125 feet down they cut through a plum bush three inches in diameter, and they had to pound on it with a sand pump for one and one-half hours to cut through it on account of the pump being dull and the ground soft. The wood showed in good shape; was very hard, and showed the grain very clearly; it was in such good condition that he could tell what kind of wood it was without any guessing.

In his opinion it is impracticable to put the two rivers together. It would make so much water in one stream at flood time it would be very dangerous, and if it should get away would do an immense amount of damage. If they want to do something with the floods they should build dams and reservoirs in the Canyons and save the water for irrigating purposes; it would cost less, and the irrigating water would be worth more than the cost.

Mr. Durffy says that about 1889 the water from San Gabriel Canyon broke out of the old bed just below the Santa Fe tracks,

where the steel bride is, and went westerly toward Duarte, and then down on the westerly side of El Monte. The Santa Fe and some of the people down at El Monte decided to turn it back into the old channel one Sunday, and he, and others interested did not say what the names of the others were, did not get wind of it until Saturday afternoon, and he came to town to get an injunction, but County offices were all closed up and he could not get an injunction out. The Santa Fe bought out quite a bunch of men and quite a number came up from El Monte early Sunday morning and commenced building a dam to turn the water back into the easterly branch, or where it had run before it broke out. He and some others that were interested in keeping the waters over on the westerly side as it had gone over there from natural causes, and it was the lowest side, found by experimenting with a shovel, and as the other side has all the disadvantage of a direct drop of from 2 to 2½ feet, that one man with a shovel was worth more than 50 men on the other side building up, and they decided they did not need an injunction. He says part of the water has gone there ever since.

He says he does not know anything about the rock dam Mr. Dodson built about half a mile above the Peck place, and claimed that some people from Downey and the Scott people and himself helped the water to tear down. He thinks Mr. Dodson must be mistaken; and anyway the dam he built could not have amounted to much in keeping the water from going over the El Monte way, as it was too far south to help much; that most of the water went over on the west side before it got down that far.

Logs of City Wells of Sahta Ana, used to supply City of Santa Ana with domestic water.

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WELL No. 7

Drilled by Holstrom & Boster--Feb. 1913

0	24	24' Soil
24	31	7' Gravel
31	45	14' Clay
45	51	6' Sand & Gravel
51	98	47' Clay
98	139	51' Sand & Gravel
139	165	26' Clay
165	173	8' Sand
173	187	14' Clay
187	197	10' Sand & Grqvel
197	200	3' Clay
200	226	26' Gravel
226	291	65' Hard Clay
291	309	18' Gravel
309	324	15' Hard Clay
324	348	24' Gravel
348	355	7' Clay
355	364	9' Gravel
364	432	68' Clay
432	437	5' Gravel
437	447	10' Conglomerate
447	482	35' Clay
482	487	5' Gravel
487	489	2' Cement Sand
489	511	22' Hard Clay
511	517	6' Sand
517	620	103' Hard Yellow Clay
620	625	5' Cemented Clay
625	635	10' Sandstone
635	665	30' Blue Clay
665	725	60' Yellow Clay
725	768	43' Clay, rock and gravel
768	785	17' Brown clay & sandstone
785	802	17' Blue Clay, blue sandstone and rock
802	822	20' Sea Mud
822	838	16' Hard Joint Clay
838	848	10' Yellow Clay
848	860	12' Blue Clay
860	867	7' Hard Sand
867	878	11' Joint Clay
878	884	6' Yellow Sand Clay
884	895	11' Yellow gravelly clay
895	905	10' Gravel
905	908	3' Clay
908	912	4' Sand and Clay
912	936	24' Red Clay
936	941	5' Gravelly clay
941	945	4' Hard Clay
945	949	4' Hard Sand and Gravel
949	960	11' Clay and etc.

END WELL

Well perforated from 907 to 885 foot with 95 holes, 5/8" x 7"
Well perforated from 438 to 425 feet with 60 holes, 5/8" x 7"

Pump man says they have no accurate gauge, but it pumps something like 40 inches with air compressor.

139

Well No. 6

Drilled by J. A. Winn

0	2	2' Black Adobe
2	6	4' Yellow Adobe
6	8	2' Sand and Gravel
8	12	4' Black Gravel soil
12	30	18' Sandy yellow clay
30	37	7' Gravel (surface water)
37	40	3' Yellow Clay
40	43	3' Gravel (water)
43	48	5' Yellow Clay
48	60	12' Gravel (water)
60	150	90' Red gravelly clay
150	180	30' Red and blue clay mixed
180	200	20' Yellow Clay,mixed cement
200	202	2' Cement
202	212	10' Gravel
212	226	14' Coarse Sand
226	254	28' Blue Clay
254	287	33' Hard Red Clay,mixed gravel
287	290	3' Cement sand and gravel
290	308	18' Gravel, (water)
308	319	11' Red sandy clay
319	321	2' Conglomerated gravel
321	354	33' Yellow Sand Clay
354	380	26' Blue Clay
380	478	98' Yellow clay very hard
478	482	4' Conglomerated gravel
482	560	78' Yellow Clay (Hard)
560	584	24' Loose chalky formation
584	604	20' Dead sand
604	620	16' Coarse Sand
620	630	10' Blue Clay (Hard)
630	668	38' Bay mud
668	669	1' Cement shell
669	672	3' Cemented sand
672	675	3' Red Clay (very hard)
675	678	3' Red Clay (very hard fine)
678	679	1' Gravel (no water)
679	716	37' Loose chalky formation
716	721	5' Dead Sand
721	738	17' Dead Sand and Gravel
738	742	4' Hard chalky clay
742	757	15' Soft Bay Mud, loose sand
757	762	5' Coarse dead sand and gravel
762	764	2' Hard soapy shale (light color)
764	776	12' Loose sand and sandstone

776	778	2' Sand
778	784	7' Hard Black sand
784	792	8' Blue quicksand
792	820	28' Shale (nearly black)
820	821	1' Cemented sea shell
821	823	2' Light brown shale
823	830	7' Dead yellow sand
830	876	46' Black sand shale
876	890	14' Yellow Clay
890	897	7' Red Clay (very hard)
897	911	14' Gravel (water)
911	912	1' Red Clay
912	915	3' Gravel (water)
915	937	22' Red clay cement
937	946	9' Cemented sand and gravel
946	952	6' Red Clay
952	960	8' Sand and gravel (no water)
960	962	2' Red Clay
962	963	1' Cement
963	1033	70' Mixed blue and yellow clay
1033	1057	24' Sand
1057	1059	2' Red Clay
1059	1061	2' Cement
1061	1070	9' Brown shale (very sticky)
1070	1118	48' Brown,yellow,blue clay
1118	1124	6' Dead sand and gravel
1124	1126	2' Blue Shale
1126	1128	2' Brown Shale
1128	1140	12' Gravel, sand and cement
1140	1142	2' Hard sand
1142	1145	3' Green shale
1145	1148	3' Fine Gray Sand
1148	1154	6' Green shale
1154	1158	4' Fine Gray Sand
1158	1160	2' Hard brown sand
1160	1161	1' Cement
1161	1168	7' Bay Mud (black)
1168	1172	4' Gray Sand
1172	1174	2' Shale
1174	1195	21' Blue quicksand
1195	1205	10' Cement,sea shell and sand
1205	1209	4' Shale
1209	1215	6' Hard Sand
1215	1232	17' Blue quicksand, sea shell
1232	1240	8' Dark brown shale
1240	1244	4' Gray Sand
1244	1248	4' Dark brown shale
1248	1256	8' Red potters clay
1256	1259	3' Gravel
1259	1263	4' Yellow Clay
1263	1264	1' Cement
1264	1275	11' Yellow Sand
1275	1277	2' Cement
1277	1286	11' Hard sand,loose cement and rock
1286	1300	14' Yellow Sand

This well was pumping about 40 inches with an air compressor and they got about 40 inches and they put in a marine pump and got about 80 inches.

243

Well No. 8

At Santa Ana City Pump Station. Well drilled by Holstrom & Boster, May 24, 1913.

0	6	6' Soil
6	8	2' Gravel
8	20	12' Clay
20	48	28' Gravel(surface water)
48	100	52' Clay
100	133	33' Sand and Gravel
133	151	19' Clay--END WELL

Well perforated from 100 to 140 feet.
18" well casing.
Well pumps about 40 inches with air compressor.

There are five other wells, none of them more than 200 feet from one another, and one 350 feet well right by the side of the 1300 foot well, but they have no logs for the other wells.

According to the pump man, in charge, there is more water in the strata from 100 to 140 feet than in the deeper strata, but the water from the deeper strata is better water for domestic use. The water from the 100 to 140 foot strata is inclined to be hard and the deeper water is softer and better drinking water.

The wells are about 2 miles from the Santa Ana river.

The pump man does not think the overflow or flood water has any effect on the wells, he has been here about three years, and the elevation of the water in the wells have not changed enough to cause them to change their air pressure. They use air compressors to pump with.

245

C. C. Bremond, R.FD. #2, Norwalk.

Was seen at his home on the south side of Center Street, just east of Galena St. about 2½ miles southwest of Artesia August 26, 1914, by R. A. Borthick.

Says he has lived here since 1877 and seen much more water in 1884, that is the whole country was flooded, but the water got higher at his place in 1914 than ever before--some six or eight inches deep.

In 1884 the country was so full of water that the roads got so you could hardly drive on them and if you got off the roads you would mire down. His wife says she got mixed crossing the roads in front of their house. And all the bridges were washed out. Says up to 1884 the New river channel was right through Belleflower where the schoolhouse stands and in 1914 it changed about a mile easterly

and took down Shady Lane or Lover's Lane as the road was called, and there is about the official channel of New River is now. Says when he first commenced cultivating his place he used to find pieces of pine bark and chunks of wood a foot under the surface of the ground.

The 1889 flood was a large flood but the water did not get on their place in that flood. The 1914 flood in their section was caused by a break in the river about a mile below Washburn or Downey bridge. It was caused by the County bridge across river on La Mirado road, the bridge got choked up with piles, trees and everything else and he says when the bridge went out she popped right up into the air making a noise like several cannon. Says he was not there but a pile driver who had been working there told him the channel above the bridge was filled up about six feet with sand and he said if the bridge had held a little longer the river bed would have filled up completely with sand the river would have left its bed altogether but when the bridge went out there was still water enough running to cut out a part of the channel again.

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246
C. G. Bremend - continued

Was seen the second time October 27, 1914 by R. A. Borthick. He thinks the flood or overflow has a n effect on the surface strata of water. After an overflow the ground is damp for a whole season about a foot underground and in dry years the surface water is from four to six feet in this section. The overflow has no effect on the Artesian or pump water, any artesian or pump water goes into the ground up at the foothills. The well water in this section is about one hundred and twenty five feet to water, years ago it flowed the year around but now it flows only in the winter time. Says he dug a well several years ago and struck a log about two hundred and eleven feet deep and the log was in good shape and he says they hammered on it for weeks with sand pump and could not get through it and had to let it go at that depth. He thinks it was a fir tree but others thought it was a sycamore tree. It was in as good shape as if it had been buried about a year. He says a neighbor of his dug a well and got bones, did not know what kind of bones, at a depth of about two hundred feet.

He says the depth of his soil is about a foot of sediment, then a black soil one to two feet thick and then a streak of gray sand, not a wash sand, says if you put it in water makes the water riley. He used to think it was a fertile soil but his neighbors claim not, they say it is dead and has no life.

The river has made hundreds of acres of good ground out of ground that was of no value, the overflowing and dropping sediment, all through Belleflower, and the Bixby Ranch and over in Compton section. He says that he would like to have an overflow if there was no danger of it cutting and tearing the ground to pieces or dropping coarse sand but there is so much danger of washing and

cutting that he had rather take his chance and help keep the waters in a channel and do without the overflow, even if it does enrich the soil and kill the squirrels and gophers.

He thinks two hundred foot is wide enough for the channel, if they do not throw all the water into New river, but it would be a good idea to own some ground on either side of the levee, so as to have something to work with in case the waters broke through the levee. They have a case of that kind now where the river broke up near La Mirada bridge, they have no ground to work with and the owner of the property where the water went does not want to let them use his ground.

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247
W. H. Lander, 1160 W. 36th Place, Los Angeles

Mr. Lander was seen at his home, 1160 W. 36th Place, Los Angeles, August 28th, 1914, by R. A. Borthick.

Says he was born in 1854 opposite the Temple block in an old adobe that used to stand there and when he was a boy when you got below First St., you were in a cattle country. He helped to lay out Pasadena and the whole country was covered with brush higher than your head and they had to cut trails in order to get through and says it was the same way on over toward El Monte and through El Monte, covered with heavy brush, willows, elder, oak trees and some pine trees. Says that there used to be much more rainfall in early times than in the later years and it did not run off as it does at present. He has seen Gardena and it was covered with water. Likewise Strawberry Park and Inglewood. The water would be hub deep on wagon and if you got off the road anywhere in that section you would mire down. He has seen the whole south of Inglewood and all the low ground in back of Inglewood flooded in the winter time. Has seen water four feet deep in that section. All Watts, Compton and Green Meadows was swampy and damp and covered with slough, tullies and salt grass and has seen the whole country in that section under water. Says he used to hunt duck and geese in that section and all over the Ballona and Cienega country. Says Nigger Slough used to come north about to where Strawberry Park is at present as far as Wilmington Road and in flood seasons the water would get to be a foot or so deep on Wilmington Road. Says the upper end of Nigger Slough separated from Nigger Slough proper; don't know just when, they called the upper piece Amstoy Lake--named after old man Amstoy. His house was close to the old halfway stage house. The Amstoy lake was in the neighborhood of Gardena and Strawberry Park--all dried up years ago.

His Aunt owned the Pacific Salt Works, and he has been in the salt wagon when he was a boy, does not remember the year, and they had to unhook the teams from the wagon and ride out and leave the wagon, with only a ton of salt on. The water was up to the hubs and they could not pull it any farther, and it was about a month before they could get it out. The wagon was left near the old

Halfway House. When they were building the outfall sewer he was on the survey bunch and there had been lots of rain and he told the driver to be careful and not get off the road, but he did not pay attention and got off the road a few feet and they were bogged down and it was about a week before they could get the wagon out. When he was a boy the Los Angeles river in the big flood times would get up high enough for the water to run down next the bluff about where the Los Angeles and 9th streets are, and would flood the whole southwestern section of what is now a built up section of Los Angeles, at that time there was practically nothing there.

In 1867 the water was a foot deep on Main st., and it was nothing but a country lane at that time, not roaded up or anything of the kind.

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249
W. H. Lander, 1160 W. 36th Place, Los Angeles

Mr. Lander was seen the second time on October 23, 1914, by R. A. Borthick and confirmed what he said August 28, 1914, and added the following:

The San Jon de Reyes, or King's Water Way, used to start up back of where the Old Normal site is or about Fifth Street and drained all the hills up back of there and there was a big ravine down what is Temple St. and it split and part of it went down Fort St. or what is now Broadway to about Fifth Street and then around the point of hills and joined the San Jon De Reyes, says there used to be quite a tullie patch about where Fifth Street is. In big rains he says the Gulch from Temple and the water from off the hills made quite a stream, and then there was a big gulch ran down somewhere about Grand Ave., and there was a bridge across it at 7th St. and Pico, and it ran down to about where Kansas St is and turned west. From about 20th St., there was not much of a gulch flattened out and spread all over the country and below that the country would be overflowed for weeks, in the wet seasons, says he has shot duck in that section of the city. The water would go on down to the Cienega country and he has seen the water four feet deep down in where the Los Angeles Investment Co., cut up a big track and built houses, the overflow got pretty bad in that section in the 1914 flood. This stream used to be bad in the big waters, would wash out the bridges and the people from the southwest could not get into town.

He says there used to be lots of water run down Washington St. and when the sewer was put in it showed a regular river sand all down that street.

Right where the S. P. freight station sets used to be a slough and he has caught fish and turtles there but he thinks that water used to be caused by the ditch from the Old La Toma which was a lake, they had a dam across the river about where the Buena Vista St., bridge was and formed quite a lake to get the water into the ditches, used to go swimming there when he was a boy.

Says Florence was a regular river bed and they used to have gravel pits to get sand and gravel to ballast the road bed of the

R. R. from Commercial St. to Wilmington]

In 1884 he was living on Center St., just a few doors from First St., and he sent his family out when the water got to be about knee deep on Center St., carried his children to a hack and sent them and his wife to some relatives and he stayed to watch his household goods and he says the water got to be about three and one-half feet deep on Center St., and there were small houses washed out as far over as Alameda St. And the country on down below in the flat section was a lake. In 1887 he was camped at Sunny Slope on Vermont Ave., where it hits the foot of hill, working for Redondo Beach Co., surveying, and a big rain came and the water got about a foot deep at their camp and he walked in on Vermont Ave., and the water was about knee deep all the way in on Vermont Ave. The R. R. was a skeleton after the flood being held together by the rails, roadbed washed out most of the way all along Vermont Ave. It was right after that when they raised the grade of the S. P. tracks along Vermont Ave., and the City Engineer raised the street grade to conform to the R. R.

He says there has been several floods in his time that have had twice as much rainfall as the 1914 flood.

He does not think the floods have any effect on surface water plane and knows it has nothing to do with Artesian flow.

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250
George C. Buehn, Artesia, Calif.

Was seen at his home on Center St., just east of Galena St., about two and a half miles southwest of Artesia, October 27, 1914 by R. A. Borthick:

Says he has lived here all his life or some twenty-eight years. They had an overflow on their home place in the 1914 flood some six inches to one foot deep, something he had never seen before in his time. Artesia has had flood water before but never from the river, says it came from the slough that leads out of Little Lake and down close to Norwalk. That slough has had about all disappeared, the people have scraped it full and leveled the ground up and made alfalfa fields and cultivated across it till it hardly shows any more.

He says it does not matter whether it has been a dry year or wet year the surface water begins to raise about September in this vicinity. He does not think the overflow has much to do with the surface water, he thinks if there is a very wet year, the surface water on a piece of ground that has not been overflowed will be about the same depth as one that has been overflowed, if in the same vicinity and is the same kind of soil. The overflow has no effect whatever on the Artesian or pumpwater. Says in his deep well which is about nine hundred and fifty feet deep, he does not think the water even comes from this water shed but from the other side of the hills, or the desert where there are several very good sized streams that sink into the sand and have no outlet but just disappear.

He is very much opposed to turning all the San Gabriel water into New River, says it would be unfair and a detriment to the property owners in the vicinity of New River, even if they do take care of the water, there will be so much of it in large floods that they will have to have overflow ground to carry the excess water and that would certainly be a detriment to property that is in the immediate vicinity. He thinks the two hundred foot channel is wide enough for what water they get at the present time, but they should have about two hundred feet either side of the dirt levee to plant willow and cane or bamboo jetties, to hold stream in its bed. The New San Gabriel Levee district has been very much of a success and has been worth much more to the district than it cost.

He does not think much of levee or piles for a bank protection, says they are no good only in extreme cases, unless there is something to back them up. Willow jetties and cane jetties are what he thinks are the practical bank protection. The cane jetties grow very rapid he says and in three or four years you can have a growth that a rabbit can hardly get through, and if the water does get up into them it immediately stops the current and throws the water back toward the channel. He says he can show the Engineer an example of willow and can jetties near his place that would withstand almost any amount of water.

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Well Log:

The well is located on Center Street, about eight hundred or one thousand feet east of Calena Ave., in Artesia district.

The well was dug by Bramlette Bros. D. Bramlette kept the well log.

0	8	8	Soil
8	20	12	Sand
20	77	57	Clay
77	82	5	Mucky Ground
82	93	11	Clay
93	96	3	Gravel Clay
96	137	41	Clay
137	145	8	Sand
145	158	13	Coarse Gravel
158	174	16	Sand
174	180	6	Clay
180	185	5	Sand
185	203	18	Clay
203	215	12	Sand
215	223	8	Coarse Gravel
223	249	26	Cla y
249	259	10	Sand
259	273	14	Clay
273	291	19	Sand
291	295	4	Clay
295	308	13	Mucky Sand
308	313	5	Clay
313	330	17	Sand
330	337	7	Clay

337	350	13	Sand
350	358	8	Clay
358	383	25	Coarse Sand
383	457	74	Clay
457	489	32	Sand
489	500	11	Clay
500	509	9	Mucky Sand
509	511	2	Clay
511	527	16	Sand
527	543	16	Clay and Cement
543	548	5	Sand
548	557	9	Clay
557	563	6	Sand
563	578	15	Coarse Gravel (cut)
578	583	5	Clay
583	603	20	Mucky Sand
603	612	9	Clay
612	625	13	Muck
625	639	14	Sand
639	650	11	Sea Sand
650	657	7	Clay
657	671	14	Mucky Sand
671	727	56	Clay
727	731	4	Mucky Sand
731	741	10	Coarse Gravel (cut)
741	743	2	Clay
743	747	4	Pack Sand
747	757	10	Clay
757	763	6	Sand
763	765	2	Clay
765	771	6	Sand and Clay
771	786	11	Coarse Sand
786	853	67	Clay
853	855	2	Gravel
855	863	8	Clay
863	869	6	Gravel (cut)
869	881	12	Clay
881	937	56	Gravel (cut)
937	943	6	Clay Gravel
943	947	4	Clay

Thinks main supply of water comes from the lower strata, when well was first cut and for about a month it flowed ninety eight inches and flows about sixty-five to eighty inches the year around at the present time. The water is good clear, soft water and cool.

256

J. T. Wilson, San Fernandd

Was seen at his office in San Fernando October 22 nd, 1914, by R. A. Borthick.

Says he first came to the San Fernando Valley Easter morning 1871 form Los Angeles. Crossed the Los Angeles river at Cahuenga crossing. The Los Angeles River was at the same place, and

practically the same place as at present; but the Tujunga Wash was running into the Los Angeles river at that time about where the Franklin Canyon pipe line from the San Fernando reservoir crosses the Los Angeles River. The Pacoima Creek was about where it is at the present time, but was only about one-third as wide as it is now.

The Tujunga Wash country was covered with juniper and elders and some oak trees. The Juniper would be in big clumps, and some 30 or 40 feet high, and the trees and brush run down to about there the good roads are between Burbank and Lankersheim, and there were few washes in that section; what there were were narrow and deep--there were no great wide stretches as at the present time.

Over on the Pacoima side, or in about Van Nuys, it was a large cacti patch, higher than your head all through that section.

In the Spring of 1875 the Tujunga broke out at the S. P. R. R. and followed the railroad as far as the large culvert between Burbank and Roscoe across the San Fernando Road, and then went across the San Fernando road and railroad and on down between Burbank and Lankersheim and made a part of those big washes, which only carry water in very heavy floods.

He said it turned the R. R. up on its side, and one rail stood above the other just like a picket fence, and acted as a breakwater from where the Tujunga rock crusher is to the large culvert south of Roscoe, some two or three miles. That flood was not much of a flood--did not last but a short time. They just pulled the R. R. tracks down and run the trains on them, did not have to haul in to fill up. Says after the washout it left the ground in about the same shape as it is at the present time.

In 1877 the S. P. R. R. Built a dike or breakwater to make the Tujunga waters go under the R. R. where the pile bridge across the Tunjunga is closest to San Fernando. They built a dike from where the bridge is closest to San Fernando, up toward the point of the hills, some two miles in length, of stone, brush and sand. There were 175 men and 25 teams working for threemonths. Mr. Wilson was on the job. He says as he remembers it the opening left under the tracks was about 300 feet wide. The first break was made in 1884 and considerable of the dike was washed out at that time, and it has continued to wash it in every large rain since, until there is not much of it left.

Says the 1884 flood was the big flood of his time. The Pacoima river bridge was about twice as long as at present and the same elevation, and the water stopped over the tops of the rails and washed out 300 or 400 feet of a fill the S. P. had and went on down and slopped over the banks and flooded the Cartoon Ranch, on through the Hickson Ranch and on down to the Home Ranch by the bluff and all the flat country of the Suburban Homes people, and there was still enough water going down the Pacoima Wash to put four feet of water in the Kester Ranch barn, which is just south of the Organ factory in Van Nuys, and the whole Van Nuys section

of country was under water. That was then the big channel between Lankersheim was cut out and the big wash formed between Burbank and Lankersheim. The Tujunga changed considerable, and instead of joining the Los Angeles river at Franklind Canyon it joined it where it does at the present time, or near where the Cahuenga Road crossas the Los Angeles river.

He says the water was running so high and the country cut up so badly two or three days after the highest water, that it took him two days to make the trip from Los Angeles to San Fernando, and he had a mighty good team and buggy, could go almost anywhere with them whether there was a road or not. He had to go way around by Calabasas. The whole country was flooded, and most of the roads washed out. The flat country up around where Marion is now was a lake of water.

In 1889 the most severe flood occurred, but in the San Fernando valley it did not do as much damage as in the 1884 flood, but in other sections it done more damage. In Soledad Canyon it swept it clean and took the R. R. out. It flooded the lower section of San Fernando valley, but there was not the same amount of damage as in 1884.

The 1884 flood was in February and March, and it covered up quite a lot of grain in the Van Nuys section with sand and sediment. Says if they will build settling basins and dams in the canyon to take the sand and gravel out of the water, and clear it, then it will cut the size of the stream about one-third.

Says in the floods or high water the streams are carrying about 30% of sand and gravel. There will have to be some kind of bank protection to care for the banks of the stream, or in high water they will cut and tear to pieces and break out and make new channels. Willows, bamboos, pampas grass and several other kinds of grass are good for bank protection.

He says in a hard rain or flood, when the water is running swift over the ground there is very little of it going into the ground, no matter how coarse the sand and gravel the streams are carrying so much sand and gravel that it forms a kind of slick surface on the stream beds, and the water passes right on and does not go into the ground. Says you can dig down in one of the dry arroyas after a hard, quick rain, where the water has been running several hours, and you will find it has not wet down very far. But when it has been a slow rain, and the water has stood in pools and no quick run-off it will have wet down much farther. Says if they expect to increase the underground or well supply of water they have got to figure out some way to still the water to get it to go into the ground.

One way to do this he says, is after they make a channel through the loose boulders and gravel below the mouths of the canyons, is to dig laterals from the channel with a steam shovel, make them 10 or 15 deep and pile the dirt on the lower side and make them in such a course and distance apart that the water will back into them

and become still and then it will go into the ground. He says this will not have much effect on the floods below, but will help some, and will increase the underground flow.

Mr. Wilson says the work done on the San Fernando storm drain was no manner of good, and he told them it was no good when they were building it. You cannot build a cement protection ditch in the dry sand without wetting it down, and expect it to stand any strain, or for that matter stand alone for any length of time; nor can you build a ditch to carry water that carries about 30% sand and have a 6% grade, and break it to a 2% grade and carry the ditch the same size and not have it fill up with sand.

Mr. Wilson thinks the overflow water does not have any effect on the surface plane of water; says in a good, slow rain, there is more water goes into the ground, even if there is not half as much falls as in a flood, or quick, hard rain, when it all runs off.

The Pacoima creek and San Fernando Creek are running through the Mission lands about the same place as when he came here first, but the Pacoima is much wider, and has done more washing, than it originally did. Says Van Nuys and that section used to be a big cacti bed, and the water wandered through the cactus and did not do any washing or cutting as at the present time.

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260
A. B. P. Pratten, Downey

Was seen at his home in Downey August 10th and October 30, 1914 by R. A. Borthick.

Says he came to Downey in 1867; taught school in 1867 at Old Gallaton School in Silver District, and the town was called Gallatin. There were two saloons, a couple of general stores and a blacksmith shop. The town died when the S. P. was built and moved to Downey. He says the flood of 1867 made New River but did not cut out much of a channel. The channel it cut in 1867 did not carry one-tenth of the water that went down to Alamitos Bay, that it spread all over the country and made lots of sloughs and swampy ground down near where Belleflower, Clearwater and Hynes now is. Says he has caught fish in the sloughs and the people used to shoot ducks over in that section. The 1884 flood cut the channel much larger and deeper and changed it in some places he thinks, generally to the east.

He lives on College Road #3 about one mile east of the S. P. R. R. and the water never overflowed that particular section in his time, except in 1891 when it overflowed that whole section. He claims that the cause of that was a may by the name of Bengle who lived on the Rio Hondo just a little below the station of Rio Hondo on the Whittier P. E. line who cut the willows out of a piece of ground he owned on the river bed and when the water came up it took off through the place where he had cleaned out the willows and came down to a swale that leads through Downey by the S. P. Depot. Water was about three feet deep at the depot, backed up by the R. R. tracks

and it ran over the R. R. tracks down to New River in a southwesterly course. He says the water in the 1867 flood did not come closer than one-half mile of where he lives at present. When New River formed it followed down about the old irrigating ditches in 1867.

Says he has seen water all through Clearwater clear over to New River, and from Clearwater to Compton--1884 or 1889. When he came to Downey the Los Angeles river bed was very close to Compton, and he thinks (not sure) it was in 1884 when it broke into San Gabriel near the County farm, and at that time a part of the water went out down by the lower end of the County Farm and down east of Clearwater. He does not know that the Los Angeles river water went into Alamitos Bay, but the waters of New River and San Gabriel met--whole section a sheet of water.

Mr. Pratten showed what was formerly called Mission Creek by a part of the people, so called because Old Mission settlement and Old Mission used to be on the bank of it, and called Rio Hondo by the Mexicans and a part of the old settlers. He says it used to be a live stream about twenty feet wide on the old road to San Bernardino between Old Mission Settlement and Temple Ranch house, and now there is a bridge across it at least one thousand feet long. He says it used to be good ground and vineyards and barns, and not it is nothing but a waste of wash and sand about one-quarter to a mile wide.

He pointed out where he claimed the old channel of the Rio Hondo was in 1867 around the curve from Old Mission settlement to where the S. P. L. A. R. R. crosses Rio Hondo to San Bernardino, and he says there are hundreds of acres of good ground between the bluff along by Montebello, and between Montebello and Old Mission Settlement and where the bed of the Rio Hondo was in 1867. Now it is very near the bluff and looks to be from one-half to two miles wide, not all ruin at the present time but all river sand. He also pointed out what was the old bed of San Gabriel river in 1867 and continued south down by Gov. Pico's old home which is about one and one-half miles north of the Pico bridge across New River, and there is a stretch of old bed that looks as though it had not had any water for years. Some willows and swamp grass, and looks as if it would be wet and standing pools of water in winter time. It is a stretch between New River and Rio Hondo about a half-mile or so south of Old Temple House, and the 1914 flood had water of the Rio Hondo cut some half to a mile up the old stream very nearly the opposite direction to what the San Gabriel originally run. The Rio Hondo got within about one mile of New River in this particular place, and cut out the good roads for about a mile, and two or three hundred acres of good ground and walnut trees, and if the people had not worked very hard and got it turned, he thinks it would have cut over to New River at this particular place.

I went with Mr. Pratten from Rio Hondo station on the P. E. to Whittier down the Rio Hondo to Stewart bridge August 18, 1914.

He says in 1868 on the old Telgraph road where it crossed the Rio Hondo, which is very near the station of Rio Hondo on the P. E. Line to Whittier, the water just before it left the San Gabriel and formed New River was within five inches of the top of the east

bank of the old Rio Hondo, which bank shows very plainly and is perhaps one thousand feet east of the east bank where the last flood ran and the water he says, was over to the west bank of mesa ground, and he claims the bed of the stream was lower than at the present time--he thinks five or six feet deeper than at present. He says Jim Brookshire claimed it was anyway ten feet deeper at this point, and Gov. Gage told him a few days ago when he was talking to him that he remembered standing up on a load of poles and driving under the Foster bridge, and did not have to duck his head.

He was not there, but two sailor brothers (has forgotten their names) who lived on old Telegraph road on the east bank of the river in an old adobe home at the time told him they measured it when it was at its height, and it was within five inches of the top of the bank. Says this was the old ford across the Rio Hondo on Telegraph road.

He says the old original channel of the San Gabriel in 1867 down where the S. P. to Santa Ana crosses the Rio Hondo was just about where they did their protection work on the river two or three years ago, and the Rio Hondo broke out of the protected bed about one thousand feet north of the S. P. bridge, where there was a curve in the protected channel and took a course about toward Compton and joined the Los Angeles river. But before it went off toward Compton it went off on the east side of the bed and down through the county farm on down through Clearwater and Hynes and flooded that whole section some two or three feet deep in parts of Clearwater. Before it left the bed of the S. P. it filled its level with the surrounding contry with sand down as far as Stewart bridge, and he thinks in below that. The main channel, or where the water last ran, is about five hundred to eight hundred feet westerly of the old channel on the S. P. R. R. but there is not very much of a channel at the present time. What piles that are left on the protection work are filled practically to the top of the piles in this particular locality.

He says in 1868 the channel in this locality was a wide channel from one hundred to two hundred yards wide and deep, with well-defined banks, an average of ten to eighteen feet deep, with no obstructions w hatever--no willows, fences or grass. He knows it was seventeen feet deep some thousand feet south of where the S. P. R. R. to Santa Ana crosses it at the present time, or nearly directly west of the old Hammerton brick house. Says he knows this because he talked to old man Hammerton about it not very long after the 1867-68 flood, and he also talked to the surveyors. He does not remember what the name of the surveyor was, but thinks it was either Reynolds or Hansen; nor does he remember for what purpose they had been doing the work, nor for whom, but says he met them between the r iver and Downey, and he stopped and talked to them, and he remembers distinctly of their telling him that the bed of the river was seventeen feet lower than the banks directly west of the old brick house.

He says after the New River broke out in 1867 the Rio Hondo went down in a short time to a small flow. They could drive across it on the old Telegraph road a short while afterwards, and there was

quite a lot of quicksand in it too.

He says after the 1867 flood the San Gabriel continued to fill up and get smaller that the New River carried most of the water until three or four years ago. The bed of the San Gabriel had filled up to such an extent that just before they put in the protection work the bed would not average more than twenty-five to fifty feet wide and six to eight feet deep from a short distance above the S. Pl to Santa Ana down by and below the county farm, and there were thick willows on either side of the banks.

October 20, 1914

Mr. Patton says there was no comparison to be made between the 1867-68 flood and the 1914 flood, and he thinks both the 1884 and the 1889-90 floods were larger than the 1914 flood, that is, there was more ground overflowed.

There was much more damage in 1914 than any of the other season because there was much more to damage, and the waters were much more confined by R. R.s and good roads and pile bridges and when the water would break out it would hit the country with a large stream instead of just spreading over the country, and would wash and tear the country all to pieces.

He has no bank protection to offer, but he does not think much of the pile protection unless they can get rid of the immense amount of sand the streams carry when there is a flood. You can stand and watch the waves rolling two or three feet high and see the sand dropping as they break, and thus if there is a small branch or stick, or bunch of grass or weeds lodged anywhere it does not take but a few minutes to form a bar, and the bed of the stream soon fills the top of the piles, and then it goes whichever way the country is the lowest. He says it works just the opposite way if it gets to cutting over next to the row of piles, and eats below the wire protection on the pile and gets on the outside of the piles, and they are of no more value.

He thinks the flood water do have an effect on the surface water plane also on the artesian and pump wells. After a flood the water plane is closer to the surface, and the artesian flow is stronger.

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265
J. C. Simmons, Downey, Calif.

Was seen at his home in Downey October 30th, 1914 by R. A. Borthick.

Says he came to Los Angeles County in 1869, and has been here ever since.

The channel of the San Gabriel river from Foster bridge up is in much better state than it has eyer been since he came here; it was probably deeper at the Foster bridge before 1884 than at

present, but above that it is much wider now than formerly, and in better shape, with the exception of a few bad places.

He says the water ran over the levee about 15 minutes at Hunt's Crossing and would have broken out and come right down through Downey if it had not broken down close to where the S.P.R.R. crosses the river to Santa Ana; but when it broke down there it lowered the water at Hunt's Crossing, and the water quit running over the levee.

Hunt's Crossing is about 1 1/4 miles south of where the water broke out at the Banale place in 1891 and came down through Downey and flooded some sections of Downey pretty bad that time.

The New River got much the most water in 1884 and has continued to do so up to a few years ago.

Mr. Simmons thinks the channel should be about 400 feet wide if they take all the San Gabriel Canon water into New River. He thinks if they make a channel and confine the water and it cuts its channel any lower it will have an effect on the surface water plane, especially in the neighborhood of the channels, but will have no effect on artesian or pumped wells.

His idea of taking care of the river is as follows; Take out and keep out of the rivers all pile bridges and similar obstructions; make channels as nearly straight as possible, and make if of sufficient width to carry the water, some 400 feet wide. Put piles far enough away from levee so that willows may be planted between piles and levee--25 feet is necessary for willows. Let piles parallel levee so that drift will strike them obliquely so as not to break piles. Drive piles 20 feet below the level of the land to be protected, and wire pile at least seven feet below level of the land to be protected. To make this easy excavate the channel for the levee in the path of and adjoining line of piles. This will save thousands of dollars; first, in the distance of drawing the dirt for the levee, and second, in distance to drive pile, and third in having an open field in which to work, covering piles with wire and planting willows without shoveling dirt out of the way. (They did not do this when they did the San Antonio protection work, and threw away several thousand dollars in wasted labor).

The wire to do any good must be put down in the ground, and willows will be uprooted and washed away unless started low down.

This would be Mr. Simmons' line of work in the valley for protection, but he would first impound in the mountains and sand and boulder country adjacent to the foothills, all the water possible. This would make it easier to take care of the water in the valley, besides being of immense value for irrigating purposes and in helping keep the surface water plane up.

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267
Mrs. Lopez, San Fernando, Calif.

Was seen at her home in San Fernando October 5th, 1914 by P. A. Borthick. Mr. J. T. Wilson, Mrs. Lopez' daughter acting as interpreter.

Mrs. Lopez was born in Los Angeles in 1831, and came to San Fernando 63 years ago when she was married, on her wedding day, and has been here ever since. She and her husband lived in an adobe house, which stood where the dam of the San Fernando Aqueduct reservoir is now, and which was torn down to build the dam. She says the Wilson Canyon used to come down about where the S. P. pumping plant is and on down and empty into the Mission Reservoir, which was just a little piece above the Old Mission, and it was a live stream, and the Fathers used to store the water to irrigate with, and for domestic purposes for the mission.

In flood times, or heavy rains, the flood water would go out and overflow and spread over the flat section below the Mission, but there was no wash below the Mission, water just spread over the ground, and did no cutting. She says the Mission Fathers used to have a ditch from the Pacoima that led over to the Mission reservoir, and they used to wash and scrub out the reservoir after a flood. In big rains or flood times there would be lots of trash and mud come down from Wilson's Canyon and fill the reservoir, so they dug a ditch from the Pacoima so they would have plenty of water.

She says the San Fernando Creek or Palomas Creek has always ran about where it is at the present time, and was never very bad to flood or overflow.

She says there was very heavy rains, and large floods in 1851-52. That was the year before she came to San Fernando, and she was living in Los Angeles, and the people were very much afraid the Los Angeles river was going down San Fernando Street.

In 1858-59 there was a very big flood. She remembers the date and the flood very well, because she went to Los Angeles to a christening and looked the date up in the Family Bible, and it was between January and February, 1859. Her husband had just had a new carriage made that cost $300 and she was very much afraid they were going to lose it in crossing some of the streams. She says it rained for twenty days, and it was two weeks before they could get out of Los Angeles, and then they would not have tried it if they had not left some of their children at home, and were very anxious about them. She says there were several adobe houses just north of Cahuenga Pass that melted down and washed away in 1859. One of considerable size built by Melus, where they expected to spend the night, was melted down, and several smaller ones. The streams had better banks and were deeper at that time, and there was not the same amount of waste sand and wash as at the present time.

There three streams that they had to cross, and she was afraid every time that they were going to lose their $300 carriage.

Mrs. Lopez says that when she first came to the San Fernando valley, the east side of it was all covered with large Juniper trees, very tall and in large clusters, and in other parts there were big cacti patches.

Again in 1861-62 there was a big long rain, and the country was flooded. Mrs. Wilson says she drove from San Fernando to Los Angeles in 1884 and it seemed to her they were in water very nearly all the way from San Fernando, until they got across the Los Angeles river, and all down through the flat country where Van Nuys and Lankersheim is was a regular lake. She was going to Pomona and was held up at El Monte--the bridge was washed out.

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169
Richard Egan, San Juan Capistrano

Was seen at his home in San Juan Capistrano by R. A. Borthick October 30th, 1914.

Says he came to San Juan Capistrano in the Spring of 1868, and has always been very much interested in the water supply, floods and rainfall of the country, and has kept the rainfall at San Juan Capistrano since 1867, noting the hour of the day it commenced and ended, day of the month, year, and what quarter the wind was from, and whether heavy, light, squally or calm. He says he has watched the rainfall reports of Anaheim and Los Angeles in reference to what he gets at San Juan Capistrano, and since 1880 he finds that Anaheim is about 10 to 20 per cent less, and Los Angeles about 10% more than what he gets. He says he had a man up in the hills in San Juan Capistrano on one of his ranches, keep the rainfall for several years, and the man got about 40 to 60% more rainfall than he did at San Juan Capistrano. He has been a large farmer in this section and has watched the rainfall and floods very closely, and does not think the flood water has any effect on the surface water plane, nor any effect whatever on the artesian or pump waters. He says the big rain years are not always the biggest floods. In 1914 the water got higher up for a short while in his section than he had ever seen it before, and the rainfall was not very much above the average season, but it was on account of the condition of the ground--the water all ran off.

In 1868 the year he came here, there were large rains and the water got high in the streams, but in 1884 they were much larger and lasted longer. It was five weeks before they got any mail in this section, and the country got so wet you could hardly travel over it. Still the water reached a higher point in 1914 than 1884. He says an old-time Mexican--doesn't remember his name--had a house on the bluff above the plain or flat stretch of country down below the canon where the Santa Ana river comes out, and he told him that when he first came there was no river bed to speak of, that the whole stretch of country there was covered with trees, hundreds of acres of them, and the water just spread out and wandered through them.

He said there was heavy snow in the mountains, and a big warm rain came, and one morning he got up and looked over the plain and all the trees were gone, washed out in one night, and that section where the trees were is a sand waste at the present time.

Record of rainfall at Santa Barbara by Father Joseph O'keefe. From the original copy as written by Father O'Keefe and given to Mr. Egan.

1786	Copious rains
1787	Crops short--little rain
1789	Extremely dry--no rainfall all season
1794	Crops short for lack of rain
1795	Very dry, but little rain
1815	Very wet
1819	Little rain
1825	Very wet
1827	Very wet
1830	Very wet
1832	Very wet
1846	Very wet

Trouble of a secular nature coming on at this time, no record of crops, etc. were kept with any regularity.

Record of rainfall kept at Anaheim in Lanberger's store from newspaper clippings.

Season	Inches
1871-1872	10.00
1872-1873	9.20
1873-1874	14.62
1874-1875	13.66
1875-1876	13.88
1876-1877	4.00
1877-1878	13.00
1878-1879	4.35
1879-1880	13.70
1880-1881	7.54
1881-1882	7.65
1882-1883	5.17
1883-1884	25.82
1884-1885	6.14
1885-1886	14.83
1886-1887	9.65
1887-1888	14.91
1888-1889	15.51
1889-1890	19.56
1890-1891	15.29
1891-1892	7.78

The rainfall for the present year to date is 6.25 inches.

Record of rainfall at San Juan Capistrano by Egan, giving the date of the first day it rained and the last day in each season, and the total fall.

Dec. 20, 1876 to May 29, 1877	5.20
Nov. 11, 1877 to May 27, 1878	19.06
Oct. 14, 1878 to Apr 11, 1879	5.75
Oct. 13, 1879 to Apr 23, 1880	16.58
Oct. 7, 1880 to Apr 17, 1881	9.30
Oct. 25, 1881 to May 27, 1882	7.74
Oct. 4, 1882 to May 17, 1883	7.56
Oct. 2, 1883 to June 13, 1884	32.35
Oct. 13, 1884 to Apr 27, 1885	9.61
Oct. 17, 1885 to Apr 13, 1886	16.38
Oct. 31, 1886 to May 18, 1887	9.11
Nov. 22, 1887 to Apr 24, 1888	17.53
Oct. 18, 1888 to May 6, 1889	15.49
Aug. 12, 1889 to March 14, 1890	22.06
Sept. 27, 1890 to March 2, 1891	14.75
Dec. 3, 1891 to May 30, 1892	11.13
Oct. 24, 1892 to Apr 6, 1893	18.10
Oct. 22, 1893 to May 14, 1894	6.72
Sept. 30, 1894 to Apr 28, 1895	17.76
Oct. 20, 1895 to March 28, 1896	7.62
Oct. 27, 1896 to March 18, 1897	14.20
Sept. 30, 1897 to June 1, 1898	7.14
Dec. 9, 1898 to April 6, 1899	6.13
Oct. 1, 1899 to May 11, 1900	9.88
Oct. 19, 1900 to May 25, 1901	15.72
Oct. 2, 1901 to April 21, 1902	11.51
Oct. 24, 1902 to April 17, 1903	18.61
Dec. 6, 1903 to May 25, 1904	6.00
Oct. 8, 1904 to May 7, 1905	18.71
Oct. 21, 1905 to March 26, 1906	19.75
Nov. 20, 1906 to April 13, 1907	17.54
Oct. 14, 1907 to May 2, 1908	10.76
Aug. 9, 1908 to March 28, 1909	13.89
Nov. 9, 1909 to April 11, 1910	13.95
July 9, 1910 to April 27, 1911	10.75
Sept. 22, 1911 to May 15, 1912	9.33
Aug. 28, 1912 to July 27, 1913	10.58
Nov. 2, 1913 to May 1, 1914	16.09

175
Keno Parish, El Monte

Was seen at his home in the company of Patten of Downey, August 11, 1914, by R. A. Borthick.

Came to El Monte in 1854 and it has been his home ever since. He says in 1861-62 there were big rains and the country was badly flooded and the San Gabriel overflowed, and took somewhat the same course as where New River was afterward made in 1867. Says there was water along the road through El Monte as far over as Savannah, and in places was belly deep to a horse.

Says the waters of San Gabriel used to sink above El Monte and come out below in Spring above Old Mission Settlement about one or two miles and formed the Rio Hondo and ran all the time, but was nothing more than a branch or small creek.

He says there was quite a wash made there in 1867 close to the Old Mission Settlement, and uncovered a lot of old stumps which were buried some three or four feet and he says there must have been water there before.

He says the country east of El Monte a mile and a half or so has gotten much damper than it was before 1867 and El Monte has gotten dryer. Says he has seen the land east of El Monte, that now has walnut trees on it, when it was so dry you could hardly raise a crop of barley hay, and now they do not always irrigate walnut orchards.

He says that all through El Monte there used to be strips of swampy ground and springs, but he says they have all been cleaned up and dried up.

He says the Rio Hondo before 1867 did not amount to anything as a river or a wash. There was no wash or stream bed two miles above Mission Settlement, but there was a swale about where the wash is at present.

He says in the 1867 flood there were thousands of cords of wood which came down the San Gabriel and were scattered all over the valley to the ocean. There was an especially large amount left on the old Dalton ranch.

He claims it was sometime in the 80's that the main wash of the Rio Hondo was made above the Old Mission settlement and was not more than twenty or thirty feet wide until that time, and it has continued to get worse all the time since, until now it is from one-quarter to one mile wide.

Mr. Parish is 90 years old, and he says his memory is not as good as formerly.

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276
James Hay, Norwalk

Was seen in Norwalk September 11th, 1914 by R. A. Borthick. Came to the lower end of the County in 1875 and has been here ever since. He was Supervisor in 1893-4-5 and 6.

He says County Surveyor Street made a survey of New River with a view of taking care of the flood water in 1893 or 1894 but his idea was to riprap the banks with stone from sea to foothills, and the estimated cost he has forgotten, but ran into the millions.

Mr. Hay does not think it practical to riprap the banks with stone or anything else. After two floods your stone would all be gone--just sink out of sight when the ground get thoroughly wet.

There is no bottom to the ground in this section when wet, it is just like quicksand.

He was Supervisor in 1893-4 and was very much interested in the taking care of the flood waters, and had received very nearly all the right of way from the sea to the Washburn bridge with the exception of a few pieces, and had gotten the Bixby people to agree to a right of way, and promised to give $5,000 or equivalent in work, and the county was about to help, but the people interested--or those that were overflowed--would not get together and come forward and help any, so it was just dropped.

He says if they had not formed their district in Artesia seven or eight years ago, and done some work on the New River Artesia would have been washed away before now.

The 1884 flood was much the largest flood since he came to the country. A man could have gone from Norwalk to Compton in a boat by going around a few of the high ridges. The water got deep enough in Norwalk where the oil tank sets at present, to swim a horse, and east of Norwalk about a quarter of a mile there used to be a slough that leads from Little Lake, and it had water in it deep enough in 1889 to swim a horse.

In 1884 the country got so damp and boggy one was liable to mire down anywhere you got off the road with a team, and the mesa was worse than the valleys or low section of the country; was a regular lob-lolly, and a man would even mire down. Their cesspools were all full or flush with the ground. His horse was bogged down the first of May, 1884, plowing his vineyard, which is located half a mile north of Artesia, School house, and on the east side of the road; N. W. corner Section 31 Tp. 3 S., R. 11 W., and it was more than two miles east of New River, and was a nice piece of sandy ground, and there was a sand ridge running through the ground, and he had plowed all but the sand ridge and when he got on the sand ridge he bogged down. He fenced the same ten acre piece of ground with 3 x 4 posts in 1884 after the flood, and all he had to do was take a shovelful of dirt off the top and then work the post and it would go down as far as he wanted.

There was a large section of country where Belleflower is and over toward Clearwater and north of Belleflower that was of no value, black alkali ground, and it was filled up from two to five feet, and made some mighty good ground. Before it was filled up it was nothing but black alkali ground, and would grow nothing.

In the 1889 flood New River very nearly took down slough that heads about where the P. E. to Whittier crosses New River; the Chinamen gardeners by working, kept it from going out to speak of, but some did go out. If it had broken out there it would have gone down to Coyote Creek. He has seen Coyote Creek a mile wide, and the waters of Coyote Creek and the Santa Ana River together.

In the 1884 flood there was a little hill down by the sugar factory that was not under water. With the exception of Bixby Hill and this small hill all the rest of that section of the country was

under water. There were cat fish and carp caught right where the blacksmith shop stands on Good Roads in Norwalk, which came down from Little Lake in 1884. There was a sign put up there for fun, "No Fishing", Some water also came down there in 1889.

Mr. Hay says there was quite a flood in 1892-93, he remembers it well because he was Supervisor, and the roads were all washed out, and they had no money to repair with. Says he has known of several wells where they got wood, some as far down as 600 feet. There was a well on the Bremond place, which is about three miles southwest of Artesia that was spoiled on account of a sycamore log about 200 feet down; they could not go through it with a sand pump.

The water level of the country is much lower than it was a few years ago. There was a well in Norwalk on the Sproul place 437 feet deep that used to supply all the town of Norwalk west of the S. P. R. R. and flowed the year round; would raise about 12 feet above the surface, and now the water will flow in only a few of the wells in the winter time, and he thinks there are no flowing wells in summer time any more.

Mr. Hay says the whole beds of the rivers move. Of course the deeper down, the slower the movement. He has watched it for many years, and is positive the whole river bed moves.

Says he noticed it particularly in one instance when they were digging the Artesia ditch. They were some five or six feet deep in the river bed, and the whole mass of sand was alive and working and moving.

There are several sycamore trees around Norwalk and up toward Santa Fe Springs, and there used to be a good many more, but they have been cut down; and he says where you find a sycamore there has been a waterway there at some time. There are also several sand ridges and swales through the Norwalk country, and where there is a sand ridge the river has been there at some time, probably hundreds of years ago, but it has been there. The whole country has had water over it at some time.

Says the New River has been working to the east ever since it was formed, and has come from one to two miles east of where it was in 1854 and from Studebaker south. He thinks if they do not get a right of way and keep it straight, it is going to come right down through Norwalk, down the slough just east, or the one just west of Norwalk. The slough heads in Little Lake and divides before it gets to Norwalk, and the west one runs a little west of Main Street, and finally crosses Main Street, and down through Artesia. The slough or swale does not show very plainly now. It has been filled and leveled up in places, but it used to show very plainly, and used to have water in the wet seasons. The one on the east side of Norwalk runs off down the country into Coyote Creek, about southeasterly. Mr. Hay says it would be a great mistake to try to put the rivers together, because it would ruin rural and urban water rights, and lower the water level of the section of the country the river was taken from, and the amount of water that would have to be taken care of in one stream would be very dangerous to the section it ran through;

if it should break loose it would tear the country all to pieces.

Says the right of way if you do not put all the water of the San Gabriel Canyon into New River, should be about 500 feet wide, and as straight as possible--no turns without they are made very gradual and kept perfectly clear of willows and weeds. Says weeds do about as much damage as willows. No riprapping of stone; it will do not good, just sink out of wight. It would take whole mountain of stone to riprap the rivers, and after two flood years, all the stone would have disappeared.

Mr. Hay says he was over there where they were doing their protection work on the San Gabriel near Downey, and when they made the turn in the bed of the channel above the S.P. bridge, he told them they could not do that and keep the water in the river bed, no matter how much piling or riprapping they did, and they just laughed at him. He told them to wait and see, and now he says anybody can go and see.

He thinks one of the greatest causes of damage is pile bridges in the rivers.

In the 1884 flood the river was from one to five miles wide, and there was no R. R. service from Norwalk for six weeks. They had to coon the bridge at Studebaker to get across the river and get supplies.

Mr. Hay thinks the flood or overflow water does have an effect on the surface water plane, especially in this section of the country, or in any section where the soil is of the same nature as in this section. The farther away from the river you go the less effect it will have.

Says he has watched it very close in his well at Artesia. There used to be an old man that owned a place just next to his in Artesia and they seemed to think was a regular crank about irrigating when he had plenty of water and when he would irrigate for three or four days at a time, he could notice the water come up in his well. Also when the water rose in the river it rise in his well in proportion to what it rose in the river, and he was quite away from the river.

Levi Carse sunk a well where the Artesia Cemetery is, which is the highest ground in that section of the country, several years before the 1884 flood, and it was a flowing well in 1884 and had never flowed before nor since.

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281
D. D. Johnston, Norwalk

Was seen at Norwalk Bank in company of John Hay, and went with him to his home, November 5th, 1914, R. A. Borthick.

Came to Norwalk in 1867 and has been there ever since. Owns 135 acres of ground three-fourths of a mile southeast of Norwalk: N. E. 1/4 of N. E. 1/4 Sec. 19, Tp. 3 S., Range 11 W., and S. 1/2 of N. E. 1/4 Sec. 19, Tp. 3 S., Range 11 W.

He says years ago the ground in this section was much damper than it has been for the last ten or fifteen years. He raised corn on his place eighteen years when he first came here without irrigation, but has not done it for several years past. He thinks it is on account of so much water being pumped out of the ground it has lowered the surface water plane. Says he has had flood water on part of his place three or four times since he has been here; comes from the slouth that leads out of Little Lake and down east of Norwalk. Says he cannot remember the years but they were the big flood years, and he says it was so bad and soft one year--he thinks it was in the eighties--that got mired down in the road between his house and Norwalk.

He says he has been afraid the New River would break out some time above Studebaker and take down the slough to Little Lake and on down through Norwalk and through his place and into Coyote Creek.

He was with Mr. Hay when I talked with Mr. Hay the second time and his idea about flood water and taking care of them, and the danger the country then as well as now is under, is about the same as Mr. Hay's.

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LOG OF WELL

Located on D. D. Johnston's place

S. 1/2 N. E. 1/4 Sec. 19, Tp. 3 S., Range 11 W. Drilled

Sept. 13, 1900

0 to 105	105' Soil, sand and clay
105 to 118	13' Clay
118 to 135	17' Fine Gravel
135 to 151	16' Clay
151 to 153	2' Sand, fine
153 to 158	5' Clay, Mixed cement
158 to 225	67' Blue Clay
225 to 228	3' Sand and little cement
228 to 241	13' Clay
241 to 245	4' Gravel, fine
245 to 265	20' Sand and gravel
265 to 298	33' Yellow Clay
298 to 335	37' Fine Sand
335 to 407	72' Blue Clay
407 to 421	14' Fine quicksand
421 to 422	1' Clay and cement
422 to 493	71' Fine Sand
493 to 526	33' Fine Gravel and sand
526 to 563	37' Yellow tough clay
563 to 567	4' Dead clay and sand

567 to 569	2′	Dead clay and sand
569 to 573	4′	Black Sand
573 to 593	20′	Blue Clay
593 to 627	34′	Coarse Sand and Gravel
627 to 635	8′	Hard, fine clay
635 to 680	45′	dead sand
680 to 693	13′	fine gray sand
693 to 705	12′	Blue clay, mixed gravel
705 to 721	16′	Clay and sand mixed
721 to 743	22′	Fine gray sand, bits of wood, leaves and cement
743 to 760	17′	most blue clay, pipe resting on dead dry sand

End Well

Water comes from 593 to 627. In winter time the well will flow a little. In dry season the water will go down about 10′ below the surface. He pumps about 100 inches.

284
George Haylock, Compton

Was seen at his store in Compton, October 8, 1914 by R. A. Borthick.

Says he came to Compton in 1872 and has lived there ever since and has run a store all the time. The 1889 flood was the largest he has seen since he was in this section. There was no ground in Compton with the exception of a small strip close to the S. P. R. R. Tracks which is a kind of ridge that was not under water. The country was flooded over west of Compton as far as the slough that runs along the edge of the high ground and north as far as you could see, and to the San Gabriel river east of Compton. The water was from one to three feet deep all through Compton. Says Brinkerhoff came from Willows down Compton road in a boat.

In 1884 the country was badly flooded, probably the ground got much softer and there was more rain, but he thinks the water over in Compton section got higher in 1889 than 1884.

Says there used to be another slough through Compton and was bridged, and had water in it the year round. It was between the S. P. and the P. E. R. R. tracks, just about where the bank is on Main St. The slough he speaks of was a ditch the soldiers at Drum Barracks dug to carry the water from Compton Creek to Drum Barracks according to J. J. Morton.

He says in 1876 when he first came to Compton the section of country a little east of Compton and over as far as the river and some six or eight miles long was covered with large willow trees some forty or fifty feet higher and the wood was worth about $40 per acre.

He thinks the country has filled an average of about two feet from Compton to the river. Says some ridge of ground along the S. P. tracks. In that flood the S. P. tracks down below Dominguez

Hill was washed out and the water went over into Nigger Slough. The Willowbrook and part of Watts country used to get more or less water in the big floods. There used to be a swale or slough about a mile above or north of Compton that led from Los Angeles river toward Compton Creek and the water would go in there and flood that section in the big rains. The S. P. did not put any culvert in there and it has all filled up now.

The Linwood country, a part of the Tweedy ranch and the Lugo section was flooded in the 1889 flood.

He says the people of Compton and that section formerly got their plastering sand from Florence, and it was a regular river sand, only about three feet of silt had to be stripped off and then you struck a regular river sand. Some of the old timers claimed the river ran off through there to Ballona.

He thinks the 1884 flood waters were about the same size as the 1914 flood in this section, only the 1884 flood lasted much longer and the ground got much softer.

Compton Creek used to run a good stream the year around and the wells would flow the yeqr around, and he remembers one well that was so strong it would throw water about forty feet high. Water does not flow now only in the winter time or when they stop pumping in the beg wells. He has a well 230 feet deep, the first water you get is about 90 feet deep and that strata used to flow the year around but it has about played out and the next strata is about 230 feet down. Says there are several small clay stratas between these two water stratas. The water in this section is all about the same kind of water. The only difference is the deeper you get the warmer the water is. The water is good clear water inclined to be just a little hard.

He says from the formation of the ground in this section he thinks the whole country has been a lake or river bed at some time. If you dig down from three to six feet, some places a little less and some places more, it is sediment or made ground for that distance, than you strike a black sticky soil that looks like it had been the surface of a tully swamp and that strata is about eight inches to one foot thick. Then you strike the sediment again which is a good deal the same as the top strata and this strata varies a good deal in depth and under this a quicksand. Says you cannot dig down for a foundation, that they just level off the ground and build on the surface. He has never heard of any of the foundations settling and they have a number of brick buildings, two stories high in Compton. Says they make their foundations rather wide.

He thinks if the county had a channel about the same size the channel of the Los Angeles river is just below 7th street in Los Angeles and banks the same height, it would carry all the flood water. Thinks it would be better to own some ground either side of the banks so as to have something to work with, if it broke out or got to cutting.

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86
J. J. Hershman, Compton

Was seen at his home in Compton on Olive St., just west of the Pl E. R. R. one block, on October 10, 1914, by R. A. Borthick.

Says he came to Compton in 1876 and has lived on Olive St. ever since. When he first came here the Los Angeles river bed was a little east of Temple St. and ran southwesterly toward Dominguez home and then about where the main part of the water went in 1914 and did some bad cutting. The river bed was not much of a bed at that time, no banks to speak of. He was told by people who were here before the 1867 flood that the Los Angeles river had a well-defined bed but he could hardly believe it for when he came here it was very much the same kind of a bed as it has at the present time.

He remembers four bad flood years since he came here--1888, 1889, 1906 and 1914.

He thinks 1889 and 1914 floods were about the same size but the 1914 did much more damage. There was lots of good ground cut out and other filled with sand that would sell for $500 to $800 per acre before the 1914 flood, for which there is no sale at the present time at any price. And in the city of Compton it was bad on account of water standing so long on the ground. Gives the town a bad name to have people riding through on cars and see the water standing on the ground.

He says he thinks it was in 1889 when the Los Angeles river broke into the San Gabriel up above the County Farm and has run there ever since until 1914.

They are figuring on taking care of the slough west of Compton and have figured on a ditch 25 feet to 35 feet wide and three feet deep, commencing at the city limits and ending at the city limits some two miles long with a total fall of about thirteen feet. This slough carried a great deal of water in the 1914 flood and this was where all the water came from that flooded the section of Compton west of the P. E. R. R. That section of Compton west of the P. E. R. R. was a lake of water one to three feet deep and extended about a mile north of Compton and to the hill on the south and the hills on the west. This slough drains the southwest section of Los Angeles, and according to Mr. Hershman carries a great deal more water than it originally did on the account of the improvements of streets and roads in the city of Los Angeles and also there has and roads in the been a big amount of water turned off this way that used to go off down toward Santa Monica. The P. E. R. R. did not leave openings enough under their road bed to carry the water and it simply backed up and stood and formed a large lake.

Mr. Hershman thinks the country generally from Compton to San Gabriel has filled to a considerable extent since he has lived there. Has known of several places that have filled from two to eight feet, one place in particular is on Main street just before

you come to the iron bridge across the San Gabriel river. This place used to be very low and overflow nearly every year and now it lays quite high and just barely overflowed last year in the highest water, and when the house was built he remembers there were tons and tons of dirt haulted into build on, and he thinks that a part of that piece of ground was filled 6 to 8 feet.

Mr. Hershman says he is positive that none of the overflow water in this section of the country ever gets to the artesian strata, says if the valley flooded and water stood twenty feet deep for a week none of it would get to the artesian water. None of the water that falls on the ground or runs over the ground below the course boulders and sand up at the base of the hills ever gets to the artesian water belt. Says it may help keep up the surface water and keep the surface of the ground deeper and damper. Would naturally do that, but he says the surface water in this section has always been very close to the surface in wet or dry years, from four to ten feet.

There was a well on his place 99 feet deep when he came here and it flowed the year around, but later on played out and he dug a new well, and got no flow and but very little water at 100 feet and at 250 feet some flow but not as much as he wanted and he went 350 feet and got good flow, and he afterwards dug another well about 150 feet north of the 350 feet well and got no gravel or water till he went 450 feet not even enough water to work the sand pump with. Says they strike clay stratas just under the water bearing gravel always and sometimes they strike clay strata and no water-bearing gravel. The water at 100 feet level is a little better water he thinks than the deeper water, is not quite so hard, but both are good waters and clear.

Says he does not know of any reddish water in this section but does know there used to be about thirty years ago, two wells on the west side of Signal Hill that were furnishing water to Long Beach, and the wells were close together fifteen or twenty feet apart, both flowing wells and one of them was very reddish, and the other clear water. The one with the reddish water was the deepest he thinks, does not remember what depth either one of them was, but he says he and his wife made a trip and looked at them and he never saw any water with the same amount of color anywhere.

He would like to see the flood water taken care of and does not think it will have any effect on the irrigating water or the surface water, no matter where they decide to run them.

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289
D. W. Cate, Rivera

Mr. Cate was seen at his home on Cate road just north of Pico Station on the Salt Lake R.R. or about three and one-half miles north of Rivera, September, 4, 1914, by R. A. Borthick.

Says he has lived in the country since 1864. The New River was formed in the Spring of 1868 and there was no water from the San Gabriel into the Rio Hondo below El Monte after it was formed until the 1884 flood when the river got up enough to cause an overflow of the old channel and again in 1891 it overflowed some. In 1914 it lacked less than a foot of overflowing again. He says his father owned the ranch where he lived before 1867 and there was no wash or any sign of one where New River now runs. Of course it was the lowest part of the country but was not a wash. There were about thirty acres of their place washed badly when New River was formed.

He says up to late times there was not much of a division of the San Gabriel up near Duarte, in other words, Lexington Wash did not have much of a defined bed but a large swale and up to fifteen or twenty years ago the channel by Old Mission Settlement was a small channel some twenty feet wide and ten or twelve feet deep and was a live stream and had catfish in it. Was called Mission Creek by some of the people.

Says he was living at old Gallatin with his father which was about one and one-half miles northwest of Downey and the Rio Hondo was running mighty big and the water was standing around on the ground at the Joe Burke place, just before the New River broke out and went on a rampage, but the Rio Hondo soon went down and most of the water went into New River. Says they had to build a dam about two miles north of Downey near Telegraph road, on a sand ridge to keep the flood water of New River from going back into Rio Hondo.

Says after the 1867 flood the channel of New river from Telegraph Road north was as deep just after the flood as it is at present, and is in the same place, with the exception of where it has been straightened and protected by the farmers.

The channel of New River from Pico bridge north about one mile out down three feet in the 1914 flood. He says the waters might have spread more in 1867 but both channels were not full at the same time.

The New River has done no damage from Santa Fe bridge near Rivera north to Cate ditch dam, a distance of about five or six miles, since the farmers straightened it and kept it clear.

He thinks a channel 250 to 300 feet wide and straight will carry the water. Says a low bank with willows is a good protection but a high bank with willows is no protection as the water will eat out from under them and they fall into the stream and choke it up. There were about 300 acres washed out by the Rio Hondo along Valley Boulevard just below Old Temple ranch.

He says there was a lot of surveying done about 1894, spent some $18,000 to $40,000 to see about taking care of flood water and they spent all the money surveying and that was all that was ever done. Not a shovel full of dirt moved. Mr. Cate says the old residenters are getting tired of so much surveying. Says they would not mind if it did any good or they did enough work to earn their money. The surveying is all right but they also need some money to do some work with.

He says if they do throw all the water of the San Gabriel Canyon into New River there will still be a lot of water in the Rio Hondo from Pasadena, Altadena, Sierra Madre, Alhambra, and Salt Creek Canyon. He says they are getting a lot of water from Pasadena and Altadena that originally went to the Arroyo Seco, and there will have to be some work done on the Rio Hondo between Old Mission Settlement and Old Temple ranch and on down around the curve and he does not see why it cannot be done at present, as the channel has got to go there anyway and save the rest of that section from being torn to pieces.

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293
Charles Young, R. F. D. #2 Norwalk

Was seen at his place which is on Galena Ave., 2½ miles southwest of Artesia, August 26, 1914 by R. A. Borthick. Says he has lived here since 1877 and the water in the 1914 flood was about two inches higher at his place than any time since he has lived there. The water was eighteen inches deep at his house and on the lower end of his ranch it was some two or three feet deep, but that was down pretty close to the river.

Says the country generally was flooded more than elsewhere down there and there was much more water in the 1884 flood than in the 1914 flood, but the 1914 flood came with a rush and the water got higher in places than he ever saw it before.

He has no doubt but what the whole country has been a river bed at sometime or other, says the soil shows that, and as it filled up one side it would run over to the other side and will continue to do so as long as it carries the amount of sand it does and is allowed to wash the whole upper country down on the lower section but if taken care of it would do away with a large amount of the sand.

When he came to this section the New River channel was right through Belleflower where the schoolhouse stands, and he has shot duck all over that section of the country. It used to be more or less damp and did not drain itself very well-sloughs and waterholes. The center of the channel was filled in the 1884 flood and the water ran on either side of the old channel and in 1893 the river left the old channel about a mile below theWashburn bridge and came down what was known as Lover's Lane, which was a road with trees on either side--about a mile easterly from the old bed of the river. That is about where the improvement work was put in on the official bed of the stream. In 1914 it broke out about one and one-quarter miles below the Washburn bridge and flooded the section on the easterly side of the New River and followed down the P. E. R. R. to Santa Ana, and some of the water went as far as Coyote Creek and flooded the town of Artesia some two feet deep in parts of it.

Says about eight years ago the bed of the stream had about filled up so there was no channel and the water would just run all over the country in the wet times and did not drain itself very well. So they got together and formed a district and did some work on the bed of the stream and he says it was a success for eight years.

The assessment and river tax cost him about $500 and he would be willing to do the same thing over if it would protect him the same way.

He thinks if they try to put the two rivers together and try to carry the water all in one river from the mouth of the San Gabriel Canyon, the water will be so large and the danger of overflow or break will be too great and if it should break with such a large body the damage would be enormous. But he says if they could make two channels and keep the San Gabriel where it is and bring it across the country just above Signal Hill and keep the two channels separate until they come to tidewater the tide would help keep the channels clear. He thinks a channel 200 feet wide would be plenty large if they do not put the rivers together and if they put them together they should have plenty of right of way, anyway 400 feet and probably more. The work they did on the improvement of the channel was to secure a right of way and make it as straight as they could and cleaned the dirt out of the center of the channel about 60 feet wide and put it back on the right_way line (thinks right_way was 200 feet) and no protection of bank whatever, only where there was a crook or bend they built jetties of sticks, wire and brush to throw the water to the center of the channel, and the water filled in behind the banks with sand and debris and made very good banks of them and most of them are there yet. What caused the trouble was the bridges and the bed of stream filling up below which was causing the stream to fill up with sand in their channel and break out.

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293
T. L. Gooch, Rivera

Mr. Gooch was seen at his home, one and one-half miles north of Rivera on Passons Blvd., Sept. 1, 1914, by R. A. Borthick.

Says he has lived here since 1870. The flood water in 1884 and 1891 was about the same as in 1914. In 1884 it washed about 150 acres away in the Rincon country and 70 acres down by the Santa Fe bridge, and the ground it washed away was some of the best ground in that section of the country. There has been no flood water from the river in Rivera since he has been here.

They commenced to fight the New River in 1885 and have continued to do ever since, and have spent from $400 to $2,000 every year since 1885 on the New River from Santa Fe bridge north for about six miles or to Durffy road. In 1884 they made seventeen different cuts_straighten the river and take out bad brooks. The cuts varied in distance from 100 to 1100 feet and they have a fairly straight channel. If they had not done so the whole country would have been washed away.

Mr. Gooch says there was a general meeting of the citizens of the county called July 1st by the Board of Supervisors to devise ways and means to take care of storm waters and about two weeks after that he went to see the Board of Supervisors to see what was going to be done and they referred him to Mr. Umstead and he went to see Mr. Umstead, and Mr. Umstead was very nice about it but told

him his district would be from the mouth of San Gabriel to headwaters and referred him to Mr. Hawgood and Mr. Hawgood told him he would let him know but he heard nothing from him, and during the time he was waiting to hear from Mr. Hawgood, there was a meeting of delegates at Hynes and Mr. Fry was appointed chairman of a committee of five and Mr. Gooch says he is one of the committee of five, and they called on the Board of Supervisors about the middle of August to see if they could get any assistance to do some temporary work in cleaning out the channel and fixing up the worst places and the Board of Supervisors said they could do nothing for them, not even reimburse them if they went ahead and furnished the money and did the work themselves under the supervision of the engineers. Says he offered to get them a right of way 200 feet wide from Santa Fe bridge north to Durffy road for nothing, and he got Mr. Hawgood to say that the river would be practically in the same place as at present from the Santa Fe bridge north. But he says the Board said they could do nothing. Directly after their committee had a meeting with the Supervisors, there was another committee called on the Board of Supervisors to see about getting the county to buy fifteen seven-passenger automobiles to carry the visitors over the county that came to visit the Fair in 1915; also to get the County help to beautify the city of Los Angeles with palm trees set in cement bases along the streets. Says he doesn't remember the exact amount it was going to cost but was way up in the thousands. The cement bases for the trees were estimated at about $15 each. He don't know whether they got them or not but has no doubt but what they will, and yet they could not even help them to the extent of $1,000. He is going to see his attorney and find out why it is impossible to get any temporary help in the flood water proposition when there seems to be plenty of help for all other kinds of foolishness. Mr. Gooch says he knows the whole flood water proposition cannot be taken care of in so short a time, but he thought of the fact that a part of the tax levy was for temporary work and not all for engineering purposes. The tax levy he claims will rum up into the hundred thousands, and they do not like to sit down there and be washed away while the engineers are surveying the whole valley and mountains.

Says they are doing some temporary work by popular subscription. They already have more than $500 subscribed and are working at the present time. Says of course they cannot do enough but it will help some. The work is going to be done, and it must be done before long as the people are quitting to irrigate and the water is coming up in the New River. He says the people in his district will certainly fight if they try to put all the water into New River up at the head waters where the two streams separate. Says if the two rivers are put together, it would ruin water rights and lower the river bed so they would have to pump the water to get it into their ditches. If the rivers are straightened and two separate channels made, a right of way 300 feet wide will carry all the water. Mr. Gooch says a few went to see Joiner to see if he could do anything for them--don't know yet, says there will have to be a petition gotten out.

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296
W. C. Sproul, R. F. D. #2, Norwalk

Was seen at his home on Center St. about one-quarter of a mile east of Galena St. about three miles southwest of Artesia, August 26, 1914 by R. A. Borthick.

Says he has lived in this section since 1876. The 1884 flood was the largest flood in his time. Before 1884 the New River was running through Belleflower, where the schoolhouse stands, but in the 1884 flood it changed to the east a short distance and in 1891 it came farther east and down what was known as Lover's Lane and afterwards came a little farther east but dropped back onto Lover's Lane Channel and that was about where they established the official channel.

There was no overflow water from the river on his place until 1914, and then a small amount on the lower end of it, but no damage. There was no flood water to speak of on the west side of New River in the 1914 flood. Says Belleflower was not flooded. There was a little which went down through the Sackett place, but the river broke on the easterly side about a mile or so below the Washburn bridge and followed the P. E. R. R. tracks and went down through Artesia, and water got high enough in Artesia to go into some of the stores. Says Artesia never had any river water in it before to his knowledge but it had flood water that came down a swale or slough like in years before from Little Lake which lays up above Studebaker and used to drain quite a section of country and there used to be quite a lake there the year around.

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297
Mrs. W. R. Dodson, El Monte

Was seen at her home in the city of El Monte by R. A. Borthick, November 14th, 1914.

She says she came to El Monte with her father in 1852, and her father, Mr. M. Johnson, built the first house in El Monte in 1852. He lived at the Mission a few months before he came to El Monte. He was a blacksmith by trade. The house he built when he first came to El Monte was on what is now Main St. about three or four hundred feet east of the bridge across the Lexington Wash, or west branch of the San Gabriel, and he also built a blacksmith shop on Main St.

She says she went to school in a house which was also used as a Baptist Church in 1853. This house was located in about what is the center of the Rio Hondo, or west branch of the San Gabriel, a little above the present bridge, and it was there until the community was able to build a better house. She thinks it was in 1856, and then the old house was sold to the school teacher for a residence. The teacher's name was A. H. Hoyt, and she says there was no sign of a wast there then, not even a swale or low place.

She says she lived on the Temple ranch (her husband at the time, Mr. Charles Blakley) was a foreman of Temple ranch from 1858 to 1867, and she lived at the ranch, and she says the Rio Hondo was not more than twenty feet wide and was a live stream the year around, down at the Old Mission. She says there was no water in the Lexington Wash to speak of until 1887. There had been water there before, that is the whole section was under water in 1862, but done no washing to speak of.

She says when she came to El Monte it was all willows, swampy and a person could hardly ride through it on a horse. And there was standing water over hundreds of acres between Monte and Old Mission.

She says it was in 1855 when the imigrants came in and squatted and commenced to clear the land the cultivate it, but it was a grant and they were put off and the settlers got nothing for their work.

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258
Thomas P. McLene, Rivera

Was seen at his home just off Parsons Blvd., in Rivera by R. A. Borthick, November 18, 1914. Says he has been in this section about 30 years and he has had a great deal of experience on the river for the last 15 years and has helped to take care of New River in the Rivera district for the last 15 years, and by doing some work every year and watching it close and keeping the brush and debris cut of the river channel, they have had very little damage or flood waters in this district. There was a little back water last year on account of the P. E. pile bridge.

He thinks they are liable to do more damage with the flood control than good if they do not use a good deal of judgment. If they should go ahead and made channels and protect the banks and cause the channel to cut any deeper than at the present, they will ruin water rights and lower the water so they cannot get it into their ditches, it will also lower the surface water level the same amount as they lower the river bed. And he says to lower the water level only a short distance would be a serious matter for this section of the country. He thinks the surface water level is about 10 feet lower than it was 10 years ago. It is about 20 feet to surface water here at the present time. They have to go about 60 feet for well water and get good clear water and plenty of it at that depth.

He says if they will clear out the bed of the streams, take all the debris and as many of the crooks as possible out and clear the stream perfectly clean over to the banks and keep it that way and make it 125 feet wide and leave the bed of the stream as at the present time and take all pile bridges out of the stream and it will take care of the flood water and do an immense amount of good.

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199
J. King, 412 N. Breed St., Los Angeles

Mr. King and his wife were seen at their home, 412 N. Breed St., Los Angeles, Sept. 16, 1914 by R. A. Borthick. Mr. King was seen a second time at his office Nov. 19, 1914.

Mr. King came to Los Angeles County in 1852 and Mrs. King came in 1849.

Mrs. King lived at Old Mission when she was a girl and she says old Pio Pico told her that in the 1824 flood there was no land that wasn't covered with water with the exception of one small section from the old fort at Bixby Hill to the Boyle Heights Hills, and he said that was the year the Los Angeles river broke into San Pedro Bay. Before that time it was flowing into Santa Monica Bay.

Mr. King says the San Gabriel river originally ran on the west side of El Monte, says he would not say how long ago it was that it did so, but the country showed very plainly that it had done so, when he first came to country. There was no sign of a wash down through El Monte where there is now a wash from 1000 to 3000 feet wide, but there was a sand ridge and up above El Monte there was a large swale which was full of elder bushes and brush, that lead from up toward the canyon and over toward Savannah or about 1 mile westerly of El Monte, and below El Monte and down toward Old Mission settlement there were hundreds of acres of swamp ground tullie beds and standing water the year around. This wet low ground and a slough up near Savannah was where Mission Creek or Rio Hondo got its water from in the early times, and at that time it was a small live stream. The first time in his knowledge that any water from San Gabriel canyon went down on the west side was in 1862 and in that flood, there was lots of water went down on that side but it did very little cutting that season, but every flood since it has continued to get worse until at the present time it gets the majority of the San Gabriel Canyon flood waters.

Mr. King says he represented the Tweedy and other interests in the suit of the Aurora Ditch and Water Company against Baldwin and in that case they mentioned and contended in the pleading and transcript that the old river bed was on the west side from Old Mission up, and they won their case.

Mr. King was certain that the 1824 flood was the time the Los Angeles river quit flowing into Ballona country; says it was common report. Several old people--Lugo, Pio Pico and others often told him they knew the Los Angeles river went into Santa Monica Bay until 1824.

Mr. King says in 1852-53 there were large rains and the country got so damp you would mire down anywhere, and the mesa was as bad as in the valleys. Mrs. King says she was in Los Angeles City in 1852 and could not get home to Old Mission Settlement for several weeks.

They say in 1861-62 the whole lower country was badly flooded. Could not say just what section for there was no particular damage

done--nothing to damage.

In 1867 there was another large flood and a quick rush of water and the San Gabriel broke and formed New River and New River carried nearly all the water of San Gabriel for several years. Mr. King says the cause of New River breaking out from San Gabriel was that the river had choked up with willows and brush and kept filling until there was no channel left, and instead of it making the turn down by the Temple ranch, it just continued on straight where there was a low place or swale through the country. He says there is no doubt in his mind but what the river had run on the New River side of the valley before 1867. Says the sand ridges and formation of the country show that very plainly.

Says the lower valley has been made by the rivers, run in one place until they have dropped sand and sediment and filled that section higher than the surrounding country, and when there came a quick hard rain the river would leave its channel and seek the lowest ground and fill that up. There is very little ground in the valley below except Mesa ground that has not been made by the river. Mr. King says the rivers will have to be taken care of in order to save the country, also the San Pedro Harbor. He says the county should own a right of way anyway one-quarter of a mile wide for the New River and put as much of the water in its as possible and then there will be plenty left for the San Gabriel from Pasadena, El Monte, Alhambra, Sierra Madre and Monrovia. They should have no trouble in controlling the flood waters of this county as they have a very light rainfall. The sand is all they have to contend with and the engineers will be able to figure out how to handle that, Mr. and Mrs. King say they have seen the country so damp several times that is was nothing to see the cows bog down up to their bellies anywhere.

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301
Tom Passons, Rivera

Was seen at his home on Passons Boulevard, October 14th, 1914, by R. A. Borthick.

Came to Rivera in 1874 and has lived on Passon's Blvd. ever since, and has had considerable experience with the river and flood waters. Says the people of Rivera section on New River have taken care of the New River for several years, and they have done an immense amount of good. If the county will fix the bridges and make a channel and plant willows, in a few years the river will be safe. The channel should be about 300 feet wide. He thinks the 1914 flood was the largest in his time unless it was the 1884 flood, and in the 1884 flood nearly all the water went New River way, and in the 1914 flood both rivers were full. In 1884 New River did considerable cutting in the river bottom and ruined lots of good ground. He says the flood water has no effect on the surface water plane of the valley, if you turned the river away from the place where it is running now, it would not affect the surface water plane. Says the top soil of this section is about 12 feet deep, sediment and sand,

except where you strike a sand ridge. There is one runs across the end of his place, and the ridge is sand all the way down. Surface water about 12 to 14 feet deep, and then quicksand.

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302
J. W. Bryson, Tweedy Abbott Road, 497 R. F. D. #3, Los Angeles

Was seen on the road opposite Mr. Snodgrass' place on the Downey road October 9th, 1914 by R. A. Borthick.

Came to the country in 1883 and has lived here ever since. He says he has seen the country covered with water from Compton to Norwalk, with the exception of a few high ridges. There was more damage done in 1914 than in any other season, but he has seen the country much worse flooded in 1884-1886, and 1889. The country was so wet in 1884 that if you got off the beaten tracks you would sink right down.

He thinks it is impracticable for the county to try to take care of the flood water, thinks it would bankrupt the county.

If they had a channel 300 feet wide, and as straight as possible, and would take all the pile bridges out of the beds, it would carry the waters in the average years, but for a year like 1884 he does not think it could be kept in a channel without having an overflow.

He says the flood or overflow water does not have any effect on the surface water plane or strata.

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303
F. Snodgrass, R. F. D. #1, Compton,

Was seen at his ranch on Downey Road just east of Temple Street, near Lugo, by R. A. Borthick, August 7, 1914.

He was in Los Angeles in 1884, and does not remember much about that flood, but he was out to the ranch right after the flood of 1889 and says he remembers that one very well--says the water was from the Los Angeles river and spread out all over the country from the S. P. tracks over west as far as Green Meadow country, and on over to slough west of Compton, all over Compton and down to San Gabriel River, and does not know how far east of San Gabriel, but has been told by others that down below Clearwater there was a sheet of water between New River and San Gabriel. Their place was all flooded in 1889, and claims filled from one to two feet with sediment. He says they had alfalfa in a good portion of the ranch and it was all covered and his father just went and sowed on top, after it dried up a little, and he said they had the finest stand of crops they have ever had. The 1889 flood did no washing and cutting like the 1914 flood, and did not seem to carry the same amount of coarse sand. Their place was not flooded in the 1914 flood with the exception of a small piece on the east side of the place,

but he was pretty badly scared, and he seems to think the Los Angeles river is just as liable to go down through Compton as somewhere else if not taken care of.

The force of the water when backed up and bearing on a particular spot is terrific--says he saw one of the P. E. rails broken in two as if it were a piece of wood.

He claims a majority of the cause of the flood in the Lugo district was the P. E. R. R. to Santa Ana. Their culverts and openings were not large enough to carry the water, and the most of them were stopped up. He says two days before the high water of 1914 the water was backed up along the Pl E. line from Linwood down past Lugo, and the got up as far as the flood of the store, or more than a foot deep, and that was as deep as it got any any time in that section in the 1914 flood. When the flood came the P. E. went out about one-quarter mile east of Lugo and the water soon went down.

He thinks if they can make the reservoir and conserve the waters of the streams at the mouths of the canyons enough to stretch the time of run-off six or seven hours, it will help take care of the flood waters, and also help the irrigating supply.

Snodgrass seen a second time on October 9th, 1914.

He does not think the flood water, that is the overflow has any effect on the surface of the water plane, and is certain it has nothing to do with the well water or artesian belt. He says there is no artesian water in this section that goes into the ground below the loose sand and boulder formation up near the foothills.

The top soil at his place is from 3 to 4 feet deep, sand and sediment and then a hard pan a few inches thick, after that a kind of quicksand.

He thinks a channel 300 feet wide will take care of the water of most any storm, and he does not think it practical to try to build it large enough to take care of a storm like 1867-68 flood if it was as large as he has heard some of the old timers talk about. Log of Well on Snodgrass Place, on Downey Road just East of Temple Street, about 1/2 mile north of Lugo School. From Memory--Log lost.

Sediment, quicksand and clay	140	
Gravel	140 - 160	20
Clay and quicksand	160 - 712	552
Gravel	712 - 720	8
Clay and sand	720 - 785	65
Coarse gravel 3" to 6" in size	785 - 800	15

The well was hung up on a boulder at the 800 foot point and they could get down no farther. Lower strata is the only strata that he gets any water from, top strata not cut, all the water comes in at the bottom of the pipe. The well flowed almost 40 inches when it was dug but does not flow now only in the winter

time, and pumps about 100 inches. He has another well about 50 feet from this well, and pumped by the same rig, but goes through the first strata only, or is 160 feet deep. The shallow well just barely flows in the winter time, and it pumps about 80 inches.

The water from the shall well is inclined to be a little alkali, but the deeper well is good soft water, and clear and cold.

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305

Los Angeles News

Clipping taken from Los Angeles News,
January 3, 1868

It is almost impossible to five full returns of the disasters in this county occasioned by the late rains, but the following we believe to be substantially correct as far as heard from;

The Los Angeles River

The river commenced rising on Friday night, December 30, (1867) and gradually increased until on Tuesday it was at its maximum. It changed its course, overflowed its banks above the vineyard of Louis Willhart, destroying several acres of choice vines; then striking a point at the junction of the lands of Vincent Hoover and Mrs. White; it received the waters of the various sloughs, Arroyo Seco and others whose united force swept along the entire front of Mrs. White's vineyard. The banks were about ten feet high, but the water would undermine it, and whole sections would fall, carrying away with it vines of twenty-years growth, and the most valuable trees. The earth caved and washed within a few feet of the beautiful brick residence of that lady. Fortunately, the river fell, and by cutting down the trees near at hand, consisting of orange, lemon, walnut, etc., and throwing them into the river at a particular point, thus forming a breastwork, the house was saved, but the vineyard is lost forever.

Below the vineyard of Messrs. Sansevain and Wolfskill, whose loss of trifling, it washed away about six or seven acres of vineyard of Mr. J. Hoover. Up to the time of going to press we have not heard of any damage sustained below that point. The damage to the adobe houses in the city has been serious. On San Pedro Street, three adobe houses fell, the families barely able to remove themselves in time. Many of the old cellars were flooded, and all of the roads leading into the city were rendered impassable for a time, thus isolating us from the other part of the world.

Loss of City Dam

This dam which furnished the city with water, and had been repaired at an expense of some three thousand dollars, was entirely swept away, and until it is repaired, will necessitate the renewal of the water cart system, which a few years ago was our only source of supply.

Old Mission

At this point six houses were washed away. The owners are constructing temporary huts to live in from branches of trees and debris that have floated down the river. Here were lost fine fruit trees, vines, etc., and as the owners were Californians it was almost their sole dependence. The soil is entirely washed away.

Los Nietos

At this settlement the losses were severe. Mr. Em H. Boyd lost 100 acres; Mr. Passons 50 acres; Governor Downey about 200 acres; Mr. Murphy out of 150 acres lost 100 acres; Don Pio Pico lost about 200 acres, the river forming a new channel at that place; some Californians lost about 100 acres. On Monday evening, when the river commenced rising, Mr. Murphy and family, finding the water rising to the floor, undertook to wade to high land. Mr. Murphy and three children got to the place of safety, but Mrs. Murphy and daughter and Mrs. Casserly were caught, but succeeded in reaching a drift where they remained from four o'clock in the afternoon until midnight, when they were relieved by a boat built for the exigency. Next morning Messrs. Sharp and Baker undertook to cross the river in a boat but were swamped. They succeeded in reaching a sycamore tree, where they remained until a new boat was built, some eight hours. Several houses were washed away, among them that of Mr. Murphy, with all its contents.

A frenchman from Anaheim attempting to cross the river at that place, came to grief. Finding himself like to drown, he cut them loose, when they swam ashore. The wagon drifted a few miles down the river and was afterwards dug out, but the harness and contents of the wagon were lost.

San Francisco Canyon

On Friday last the Clearcreek stage undertook to resume its regular tips, but was compelled to return, finding it impossible to pass through San Francisco Canyon, the wash having rendered it impossible. The damage has been severe. Messrs. Scarles and Yates had their store, dwellings, stables, corral, hay, etc., washed away with a loss of about $2000. Dona Nevins' ranch is washed away, and the ranch of the mouth of the canon nearly destroyed. At the head of the canyon, a portion of the dwelling, stable and blacksmith shop of Major Gordon were destroyed.

El Monte

The San Gabriel, or a portion of it, ran through the Monte, and besides washing away many fences, and covering many farms, with sand and gravel, we hear it has washed away considerable portion of arable land in the neighborhood.

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308
Mr. S. D. Wilson, R. F. D. #2, Box 274, Long Beach

Mr. Wilson's property is located on Perris Road, west side of the road about one-quarter of a mile south of Wilmington Road, and the west side of the branch of the San Gabriel cuts across the back end of his property. He came to this place in 1894 and has lived there ever since. He says the water never overflowed his property since he was on it until 1913 except where the water ran in the bedof the river.

He says since he has been there the majority of the water would run in one channel one year and maybe the next the other channel according to the condition of the ground at the junction of the streams.

He says the 1914 overflow was much worse than the 1913. The flood did not particularly damage him but all of his ground, was covered with water, and it left more or less sand and sediment. He attributes the most of their trouble in that section of the dams and ditches built by Dominguez ranch.

He is very much in favor of doing some protection work if it is taken hold of right, and he is very strongly favorable to taking the water over into Los Alamitos Bay. He says if another flood should come the coming season, the damage would be very great because of the shape of the bed of the streams are in. They are completely filled with brush sand and willows, and there is so much sand and debris in the country that a good storm would about fill up the Harbor.

Mr. Wilson is very sure the flood water has no bearing on the water from the wells.

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309
Mr. P. M. Bengle, R. F. D. Route 2, Long Beach

Lives on Wilmington Road just east of the S. P. tracks at Bengle Station, south side of Wilmington Road, came to the place in 1898 and has lived there ever since. He says he was not there in the 1889 flood but was told by people that were there that the water came up and just over the top of the S. P. rails at Bengle and in the 1914 flood he says he was at the station at Bengle at the time of the highest water and the water was running about six inches over the top of the rails; could not see the rails at all by looking up toward Dominguez pump station.

He says the S. P. tracks have been raised at least one foot since 1889. Therefore, he thinks the 1914 flood must have been considerably the larger.

Mr. Bengle says the water was about four feet deep at his house, and he was out of the house for about a week. Says his place was filled in considerably, mostly with silt, some wash but most fill from one to two feet in places and considerably more around the barn and outhouses.

He says the flood brought lots of Johnson grass. He says his place never had any Johnson grass on it before, and he spent a month picking up the Johnson grass, but his neighbors a nd road boss did not. He says there is any quantity of it gone to seed. He says there is an ordinance in reference to Johnson grass, and he is kicking about the Horticulture Commission--says he wrote them about it but they wrote back and told him he was mistaken about much of it being washed down.

He estimates his damage at about $1,000.

He sees that he is in a very dangerous position, liable to cut up that section of the country if they had a flood--would like to see something done. (See him for high water mark on chicken houses).

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310
Bob Watson;

Lives about one-quarter south of Wilmington Road and one-half west of Wilmington Ave.

Talked with him but he seemed rather grouchy--says the whole country was on the bum.

Kicked about the good roads--says some of them were no good, and the schools--says some places they build great big and expensive homes and at the other do nothing. As to the flood he said he had seen the just as large and much larger than the 1914 flood. He said it was mostly the people's own fault, that they would build houses and ditches and dams and fill up the streams and when anybody told them they would get flooded out they would not believe them.

Says he has seen the Los Angeles river running where the Santa Fe station is, before the railroad was built, and the water ran down Alameda St., and spread all over lower end of the city of Los Angeles. Says the Watson's were all born here. At his place where he lives the house is on high ground and he got no water. He says the Watson's paid $60,000 taxes last year but was but to $55,000 this year.

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310
S. H. Dalton, 1436 E. Washington St., Los Angeles

Mr. Dalton was seen at his home, 1436 E. Washington St., Los Angeles, October 17th, 1914 by R. A. Borthick.

Says he came to the County with his father in 1851 across the Isthmus when he was a very small boy. He is not certain of the date, but it was sometime in the early 60's, when there was

an extraordinary flood, rained for about a month, and the whole country was flooded. There were no banks to the Los Angeles River to speak of at that time. He thinks the bed of the stream was 20 feet higher at that time than at the present, and the water spread all over the lower section of the city, and on down thru Vernon, Huntington Park, Watts and Compton. He says in that flood there was no damage done unless a few head of stock got drowned--there was nothing to damage. The southwest section of Los Angeles City and on down in the Cienega country used to be full of water, and overflowed in all the large rains. Watts, Compton and Green meadows were full of sloughs, tullies and swamps. There was a large shallow lake formed in the section of country near the Halfway House or Amstoy Place, called Amstoy Lake, Sometimes it would cover several hundred acres and was very shallow, about knee deep. Says he has shot duck on that lake and all through Compton and Watts, and picked blackberries by following the cow trails, and the whole section was very wet and swampy good summer pasture for stock.

He was zanjero for the irrigation of the city from 1875 up to about 1890 and whenever there were large rains they did more or less damage to their ditches, but the 1884 and the 1889 floods done more damage to the ditches than any other floods while he had charge of the ditches. The 1889 flood very nearly tore all their ditches out up above the city near Griffith Park.

In the 1884 flood the water from the Los Angeles river got over as far as Central Ave. at Washington St. and ran over the property he lives on at the present time. He says the cause of that was that the bed of the river choked at First Street. There was no damage to speak of below Fourth or Fifth Streets, except the country was overflowed, but above that there was lots of damage, quite a number of houses washed away.

In 1886 the water came down across his place again, and in 1876 there were big rains again and the country was badly flooded. 1889 was the year the Nadeau winery was washed away and the Los Angeles river changed its course and went over the country and flooded the Laguna Ranch. He says all the lower section of country was much worse flooded in 1861-62, 1884 and 1889 than in 1914, but not so much damage done, because there was not the damage to be done.

312 Rainfall as given by Thompson & West's

HISTORY OF LOS ANGELES COUNTY

Published in 1880
Taken at Anaheim:

YEAR	INCHES
1860-1861	7
1861-1862	13
1862-1863	4
1863-1864	4
1864-1865	10
1865-1866	15

1866-1867	17
1867-1868	11
1868-1869	10
1869-1870	4
1870-1871	7
1871-1872	13

Taken at Los Angeles

1872-1873	12
1873-1874	23
1874-1875	21
1875-1876	24
1876-1877	11
1877-1878	21
1878-1879	11
1879-1880	23

He says this is unofficial, gathered from all sources, and as nearly correct as possible.

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313
J. E. Trigg, Rivera

Was seen at his blacksmith shop in Rivera, Sept. 1, 1914, by R. A. Borthick. Says he has lived in Rivera for the last seventeen years and the 1914 floods was the worst flood in his time but says he has heard old timers say there were much worse floods in years before he came here. There has never been any river overflow in Rivera since he was here.

Says a channel 300 feet wide kept clean and straight with a depth of from six to eight feet will take care of all the flood waters. If the country will define an official channel and make all railroad bridges and good road bridges, span bridges instead of pile bridges, they will do away with most of the cause of damage.

He says the Rio Hondo has been filling up ever since he came to this section. It was much deeper when he came than at the present time.

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313
James Abbott, Compton

Was seen at his home in Compton on Main St., Sept. 3, 1914, by R. A. Borthick. Says he came to Compton section in 1875 and has been here ever since. In his opinion there was more water for a short time in 1914 than any time since he was in this section. But there were probably bigger and longer floods in 1884 and 1889 that got the ground much damper and overflowed a larger section of the country, but did not come with the same force or cut the country up as the 1914 flood. He was living a mile east of Lugo in 1884 and at that time the Los Angeles river crossed the S. P. where the

steel bridge is at the present time, or about a mile east of Long Beach Blvd., and he says there was not much of a bed below the S. P. tracks that the water came down under the railroad and spread out all over the Tweedy ranch and came on down toward Lugo and spread out all over the country over as far as the S. P. tracks at Compton. Says it washed out some big holes in the Lugo country and the whole section got so damp and boggy that stock would mire down.

There was quite a lot of stock up on Tweedy ranch that had to be pulled out with block and tackle.

There was another big flood in 1889 that was very nearly as large as that of 1884 and about the same country was flooded. But the 1884 and the 1889 floods did not do the same damgge as the 1914. The whole country was covered with willows and the flood water would go through the willows and wander through them and do no damage.

Says he would take the oath that there was a lake of water about as far as you could see in 1884 and 1889--only a few high spots that were not under water. He does not know how far the country was flooded to the east. Could not get over there in 1884 and 1889 but it went as far west a s the S. P. tracks north of Compton and down through Compton and flooded Compton.

He says in 1889 he was living near Lugo and the water was just about to come into their house or was about one foot or so deep and they were just about ready to take up the carpets to save them when the Los Angeles river broke over into Laguna country and the water immediately went down about one foot.

He says in his opinion the P. E. R. R. to Santa Ana caused most of the damage. They left no waterways under the road with the exception of a few pipes which did not amount to anything and backed up the water and when it broke through and washed out the road bed it came with such a force it cut and tore hundreds of acres that would not have been damaged, just overflowed if the water had not been blocked.

He thinks the only practical way to take care of the flood waters is to throw all the rivers together and get a channel about a quarter wide and make it ten feet deep and rip rap the banks. Says there will have to be something done to protect the country or the whole lower section will be ruined. He says he knows five or six people that had good ranches and well-fixed that are practically ruined and not much chance of beginning over again.

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315
Wilton King, Compton

Was seen at his home on Main St., Compton, Sept. 3, 1914, by R. A. Borthick. Says he has lived in this section twenty-seven years, and he thinks the 1889 flood was larger than 1914, but did not do any damage to speak of. The whole country was covered with willows and they kept the ground from cutting.

He says the Los Angeles river was running in the old channel down by Florence and Huntington Park and through where the steel bridge is across the old channel on the S. P. R. R. to Santa Ana and ran there prior to 1889. It left its old channel in the 1889 flood and went over into the Laguna country and made a new channel. He says formerly when the river ran in the old channel, that there was hot much of a channel below the S. P. tracks to Santa Ana. It just spread out all over the country and ran through the willows. Says the flood waters of 1889 were down from the slough west of Compton to New River. The New River used to get the majority of the water up to four or five years ago.

He thinks the rivers should have three channels and let each channel take its portion of the water. Says if you take care of the beds of the stream and protect them, it will take care of the most of the sand so it will not damage the harbor. The pile bridges of the railroads and good roads are the cause of most of the damage of flood waters.

The water supply, he says of this section, has been much better in 1914 than for two or three years prior.

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316
J. A. Montgomery, Rivera

Mr. Montgomery was seen at the Walnut Growers Packing House in Rivera, September 4, 1914 by R. A. Borthick.

Says he has been in this section forty-six years and thinks there was more water in San Gabriel river in 1889-90 than in 1914 and in 1891-92 there were some sections of New river flooded that were not flooded in 1914.

Says there has been no overflow in Rivera proper but there was some overflow in a swale just westerly from the town itself in 1884 from San Gabriel river. He says there had been an overflow before he came to this section. New river was made the year before he came to the country, and the whole country had been overflowed. Showed it from driftwood and slime on the ground. Says it showed very plainly that water had been there.

He says the country below El Monte down to near Old Mission Settlement was formerly a swamp. Some three miles square, maybe more in earlier times, but anyway that much after he came to the country, and he says that was what used to make rivera such a good country. The water would come down gradually underground and they would not have to irrigate after September. And he says in later years since the drainage of that section it is has made conditions much different. And if they go to work and confine the rivers and straighten them and run the water off with a rush it will continue to make matters worse, and probably benefit a few and do an immense amount of damage to the water supply of the country and lower the water level, which would be a serious detriment to the walnut orchards of the country. Says if it should lower the water level two feet it would be a serious

matter for the walnut growers. In his opinion thus, if they throw all the rivers into one channel and confine the river from the mouth of the San Gabriel Canyon to the sea they will go the country millions of dollars of damage by lowering the surface water level. The higher they can keep the water level thus making the water run off slower, the better for the country.

He says practically all the Los Nitos Valley is irrigated by ditches taken from New River and the ditches are taken out from one to two miles above Pico. He says if they could do any good by building dams and spreading waters so as to conserve the waters it would be a great thing, no matter what the cost but to straighten and run off the waters as quickly as possible, would be a mistake. He thinks the damage of what is washed away or could with sand is small to what would be the damage of lowering the water level of the country.

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317
Mr. J. E. Courtney, Artesia

Was seen at his ranch, a half mile south and half mile west of Artesia, August 27, 1914, by R. A. Borthick.

Says he bought the place in 1874 and has been there ever since and has seen much more water in 1884 than in 1914. In 1884 the couhtry was so damp and soggy that if you got off the road almost anywhere your horses would mire down. The water was a foot deep in the streets of Artesia and some parts got belly deep to a horse and some parts you could not get a horse out and they had to wade out in 1884.

Says he was road overseer before and after 1884 and sometime before 1884 he built the first bridge where Abbott bridge is at the present time, and says he made the bridge fourteen feet wide and built the approaches and it was ten feet to the water and now it is about four feet to the water and 150 feet wide.

The right of way for the new San Gabriel river improvement was 200 feet wide and when they did the work they cut out a channel sixty feet wide and put the dirt on the edge of the rightway line. The channel of the New river should be anyway 300 feet wide if they do not put the New River and the San Gabriel together. Says he will fight like Hell if they try to put the two rivers together.

If they should beat them and throw the rivers together, he does not know how wide the channel should be. Says his place was overflowed in 1914--the water was about six inches deep at his house and three feet on the lower and next to the river. He says a part of his property has been filled about four feet since 1884. He set R. R. ties on his south line and put seven wires on them several years ago and now the ties are partly covered up and he is going to set more posts and has several tons of wire to string on them and when the place overflows he will catch the sediment and keep building up.

New River used to run right through where Belleflower is now. Says wells used to flow the year round in this section now. They flow in winter time and about seven feet to water in summer or when they start pumping.

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318
Levi Carse, Main St., Artesia

Was seen at his place on Main St., third house west of the P. E. R. R. Artesia, by R. A. Borthick, August 24, 1914.

He says he has lived in Artesia 39 years and has seen a much bigger flood in 1884 but the water never crossed the sand ridge a half mile west of Artesia in 1884 and did in 1914 but on account of the P. E. bridge across New river, backed up the water and it ran down the north side of the P. E. tracks and some of the water went to Coyote Creek. In 1884 Jeff. Gaines went from First St. a mile and a half west of Main St. in Artesia to Compton in a boat. The channel of New River before 1884 was through Belleflower right where the schoolhouse sets. Says if the water had gotten much higher at Studebaker the New River would have gone right down through Norwalk. He says there are lots of sand ridges all through the valley and there is not one of them that has not had water in it--that is what made it.

If they throw the streams together he does not think it will be possible to carry the amount of water they will get in a big flood with with kind of sandy ground they have for banks. Says you have to clean out the channel to deep water and build jetties to protect it, if not you will fill up the bay in one big flood.

Says four years ago you could walk across the channel at the mouth of Alamitos Bay when the tide was out. It originally had a good channel and has a good channel now. When they did the work on New San Gabriel river Levy District eight years ago, the channel was about twelve feet deep at the bridge on Anaheim Road and about the same or a little more at the mouth of the bay. Says the most of the trouble they had was caused by the filling up of the mouth of the bay. He says they probably can take care of water if they don't throw it all together, but it will take constant care on account of squirrel and gopher holes. The improvement work done was a success in a way. Land that was assessed at from $10 to $20 an acre now is worth from $300 to $500 an acre. The way the money was raised to do the work was on a tax valuation--a rate of $6.25 a hundred. The ground that was benefitted the most paid on a tax valuation of $10 to $20 an acre and those that were benefitted the least and the value of their ground not increased to any great extent, paid on a valuation of from $35 to 50 and about all the actual value they received was a feeling of security. The ground is now assessed at about $150 an acre. Says the majority of the Summerset, Clark and Bixby land was of no value before improvement. It did not drain itself and he says they could not raise enough on a hundred acres to feed a goose. All the stuff that used to be dumped into San Pedro Bay before the breakwater was built used to come to Anaheim Landing. Don't know about the tides now.

If the Board of Engineers figure out a plan and carry it through to take care of flood water she will take off his hat to them.

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320
James W. Gillespie, Artesia

Was seen at his home on Main St., Artesia, August 24, 1914, by R. A. Borthick. Says he came to Artesia in 1887 and has been here ever since. He has seen water in Artesia before but not from the same place as in 1914. The water was about three feet deep in Artesia in 1914. In the 1889 flood Artesia was flooded but the water came from farther up the river.

In the 1914 flood the wagon bridge on La Mirada Road and the P. E. bridge got choked with trees, piles, boards, brush and everything else until there was very little water running below them and if they had not gone out about when they did it would have washed Artesia away. Mr. Gillespie says the flood water will eventually have to be taken care of. The county can't afford to let the amount of valuable ground be washed away that will wash away if something is not done to stop it. Assessment work on the river, while not large enough to take care of the 1914 flood, has done an immense amount of good. There are hundreds of acres now producting beets and alfalfa and that that land was not producing anything but cucle burrs and weeks. They are cultivating the ground now right up to the river bank and before the work was done there was a great waste of ground that produced nothing but weeds.

He says if they try to throw the rivers together up above El Monte there will be trouble and the natives will fight to a finish but if turned into Los Alamitos down below Artesia or down next to the hill it will come out all right and it will do not particular damage if it overflows down on the Alika flats by the bay.

He says if you make a straight channel and keep it clear down in the lower country it will keep itself clear in the upper. He thinks channel should not be too wide, on account of its starting to wind if allowed too much space, but they should secure plenty of right of way and plant willows on the sides of the right of way, and be sure and keep the channel clear of willows and brush. There will have to be considerable work done every year to keep the channel clear.

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321
A. D. Stine, R. F. D. #1, Box 26, Artesia

Was seen at his house at his ranch, three-quarters of a mile north and one-half mile east of Artesia St. August 24, 1914. Says he has resided here for eight years, and is in the new San Gabriel river district and he does not think much of the district system. His place was never overflowed and it cost him $6 per hundred per

assessment valuation. He is in favor of taking care of the river if done by Federal, State and County, but if done by district, he is strongly opposed. He thinks Los Angeles river should be turned into Los Alamitos Bay down below Artesia if possible, in order to save San Pedro Harbor and get Federal help. He thinks the waters can be taken care of. According to him the right of way should be plenty wide, anyway one-quarter of a mile wide. Says the water level is lower in his section than in 1913. Water flows in winter time. The place was much damper when he bought it than at the present time. Says you could hardly walk over it in the winter time when he came here.

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322
John Wilson, R. F. D. Route 3, Box 493

Has lived in the Lugo neighborhood for fifteen years. The 1914 flood did not get on his property at all; his property lies between Tweedy road and Downey Road. He says he was not bothered with the water last year but may be at any time. Things looked very bad until the bridge went out where the S. P. R. R. to Santa Ana crosses the Salt Lake to Long Beach.

He says if the whole county takes hold of it and tries to take care of the waters, thinks it can be done and would be very much in favor of trying.

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322
J. S. Wilbur, Compton:

Has lived around Lugo for the last twenty years. Floods several different times at Lugo but nothing like the 1914 flood since he has been here. He says the water was about a foot deep at Lago and the country was flooded some half mile west of Temple Street next to the P. E. R. R. tracks. The R. R. stopped the water and backed it up and made things much worse than if it had not been there. The flood washed the beet dump and part of the tracks of the P. E. to Santa Ana away just east of Lago. He says if nothing is done the water is very likely to go right through Compton.

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323
Mr. W. T. Slack, San Gabriel

Came to El Monte in 1860 and has been in the County ever since. He lived at Old Mission settlement with his father in 1862. His father was running a distillery at the time, and his house and distillery were washed away in the 1862 flood. Says there was a wash or draw through El Monte in 1862, but it was small and grown up with willows and elder bushes not very deep, and did not carry much water or cut out much until about the eighties. Says it cut pretty badly by Old Mission settlement and above there for quite

aways in 1867, and done more or less cutting in about the same place as it did in 1914. Says he thinks it was about 1867 that the Old Mission Settlement was washed out.

He says the cause of New River forming in 1867 and going on down to Los Alamitos by Old Pico place was that the willows had grown up so thick and large down by the Temple ranch and the Old Mission settlement that when the water came with a rush it just simply knocked the trees down and covered them up with sand and formed a bank or barrier and turned the waters off down by the Pico ranch. Some of the trees are buried there yet, and some of them were uncovered in other floods.

Before the '67 flood the Rio Hondo at Old Mission Settlement was a small live stream, fed from springs and marshy ground between El Monte and Old Mission.

In 1862 there were three big washes made down about the same place as made in 1914, took out vineyards and trees and good ground and made washes about like present ones, and sometime in the seventies they were filled up again with good dirt, and washed out in 1914. Says the country around Savannah, about a mile westerly of El Monte, and on San Bernardino Road used to be swampy and damp, and there was a lake or slough on the north of the road of several acres even in the summer time, and the slough ran off down toward Old Mission. The ground is now dry and set to trees but there is now a wash in about the same place that ran quite an amount of water in the 1914 flood and washed out the S. P. track for quite a distance, but that water comes from Pasadena and Sierra Madre Country, and not the San Gabriel River.

He says there was a lot of swampy ground between Old Mission and El Monte where the water used to stand in the summer time in the early times and they did not consider it of any value, and did not think it would or could ever be cultivated, but now it is all cultivated where it has not been washed away.

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326
Tom Hutchinson, Glendale, Calif.

Went to Downey in 1866; was about nine years old in the 1867 flood. Says the San Gabriel broke out below El Monte and went down the country to Los Alamitos Bay in the 1867 flood, and formed New River. He says at that time it was one complete sheet of water from Los Angeles to Santa Ana with the exception of a few high spots. Says there were very few trees in the country at that time and all of them were on high ground, and no bridges, fences or railroads and the water had a clear sweep.

He could not say as to whether the waters of the Los Angeles River ever went into Los Alamitos Bay, but he has seen the waters of the Los Angeles river, the San Gabriel River and the New River where they practically joined one another, and the waters of the Los Angeles River and San Gabriel went out down by the County Farm

and down through Clearwater and east of Clearwater. Says he has crossed from Clearwater to Compton when he was in water all the time.

In 1884 the rains came early and gentle and completely soaked the ground and the ground got so soft that a horse would mire down out in the fields, and then it came on hard rains and there was so much water that the whole country was a lake. He was in Downey and his mother was in Santa Ana, sick, and the last message they got from her before the Telegraph line was washed out was that she was not expected to live, and he said he was going over there and they tried to talk him out of it; said he could not swim, but he said he was going anyway. He started about ten o'clock at night, moonlight, and followed the S. P. track to where it crosses New River; a part of the piling of the bridge of the S. P. was gone but the ties and rails were still holding when he got there and he crossed on them. Says the water was about up to his knees on the bridge in places where the track had sagged, but he got across all right, but the New River had made another channel a little east of the channel it should have had, that is, a little east of the bridge, and the water was very swift and looked deep but not very wide. He made a run and jump and caught the willows on the other side of the bank and pulled himself up but lost his hat.

He had an uncle living there at that time and the New River at that time was on the west side of his uncle's place, but is on the east side of the same place at the present time. The property is some one-half mile wide. He says it partly changed in that flood and in the 1889 flood.

He was heading for his uncle's place to get a team. Says his uncle and himself hitched up a team and went on from there and they were in water practically all the time. The last stream they had to cross--Coyote Creek--was pretty deep and they came out about a half mile below the ford or where they aimed to, and where they came out at there was a bank about four feet high and they got the horses' feet up on the bank down and got the buggy and team out. This was just about daylight and he had left Downey at about ten o'clock and they had a good team and had been traveling all the time. From there on they made it all right. His mother got better and he could get no word back to the folks at Downey and knew they would be worrying about him, so two days later he made the trip back to Downey. The return trip was nearly as bad as coming but made it through. Says he saw wagons, buggies, and horses stuck all the way along and it was practically a lake for a greater part of the distance.

According to him, the 1914 flood was not much of a flood in comparison with the 1867 and not nearly so large as 1884 or 1889. He says there was more water in Downey in 1891 for a short time than any time he ever saw, but that was on account of breaking out of the Rio Hondo near where the Rio Hondo is on the P. E. line to Whittier or at Bangle Place. But it did not last but a short while and they turned it back and fixed it, but while it lasted water was about three feet deep at the S. P. Station.

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328
George Lane, R. F. D. Box 24, Downey:

Lives on Downey and Clearwater roads across from the County farm and has lived there since 1875. Says he has seen four large floods in his time--1884-1889-1891 and 1914, and thinks the 1889 flood was the largest. Says the Los Angeles River broke into the San Gabriel in 1889 at the Frank Goodall ranch; it lodged the Santa Fe bridge against the 9th Street bridge and turned it out of its bed. Up to that time the Los Angeles river had not run into San Gabriel until it got down near Dominguez Hill. He says he has seen the Los Angeles river change its course three times since he has lived here. Says there never has been any overflow on his home place since he lived there, but there was driftwood scattered over it when he came there. Old man Lugo told him the Los Angeles river used to go over into Ballona and Lugo told him he had seen it do so.

Mr. Lane says the New river and San Gabriel overflow water joined one another below Hynes in 1889. Says he has a well 800 feet deep and when they were digging the well they struck a log four hundred feet down that was in very good shape. Could not say what kind of wood it was but there was no doubt that it was a log and very well preserved of considerable size. They had to break it up with the sand pump.

Says old Globe Allen told him that he had the Los Alamitos ranch rented in 1867 and took a ditch out of the San Gabriel to irrigate with, and there was where the New River went in 1867 flood and has been there ever since, practically in the same place, perhaps a little east of where it originally went down by Bellflower and Artesia. Mr. Lane says he has a piece of ground just south and west of the County farm that has been filled from five to seven feet and he says that there are lots of places where it has done the same thing. The piece he has was all filled in 1914. Says the fall of the river in 1891 from above the County Farm down below Compton was eight feet per mile--he had levels run.

He was very much interested in taking care of the flood waters but they have been so long in doing anything that he has lost faith and got very disheartened of anything being done. Says the people will soon forget about the floods and take no interest in the project. He thinks the bed of the channel should be no more than 200 feet wide, but he believes in a wide right-of-way some one-fourth mile wide. Says if you build a wide channel it will fill up. Says build levees and use the rest of the right of way for the overflow and plant willows in that, and then out next to the levees plant several rows of gum trees that if it starts to cutting the levees you have material for protection. The majority of the water went New River way up to three or four years ago.

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330
John Townsley, Downey

Came to Downey in 1877 and has run a blacksmith shop there ever since. Says the rivers should be taken care of from the mouth of the stream to ocean with rock banks and throw the New River and

San Gabriel together where they separate and keep them together as one straight course, if possible. Says the 1884 flood was the largest flood in his estimation since he has been in the country. No flood water in the city of Downey in 1884 or 1914 from the river. There was a little flood water from the San Gabriel river in 1891--came down the old Gallatin road and broke out at the Bangle place. Says that was the fault of old man Bangle obstructing the channel with wire fence and willows. The water followed the swale that goes down by the S. P. Depot and on down and spread out over the south-east section of Downey. Did no damage. The water was about on a level with the tracks of the S. P. and the road bed backed up the water and it got about three feet deep near the S. P. Depot. Says there are sycamore trees in Norwalk and Artesia and just below Santa Fe Springs and where you find Sycamore trees unless planted by man, the river has been there sometime.

He says you could drive under the Foster bridge with a four horse team and high wagon when he first came here and now you can hardly walk under it, and it has been raised about four feet higher than it was originally. The natives of Downey went up above the Foster bridge and worked like plazes to help save the piling and rip rap of the old river assessment district. They did some good but it broke out down by the S. P. R. R. bridge. Says he has hunted duck all through Hynes and Bellflower District--used to be lots of sloughs, swamps and tullies. He has caught trout in the New River at the Alamitos house just above the tide line. They had come down from San Gabriel Canyon in flood times.

He does not know whether the waters of the San Gabriel and Los Angeles rivers ever get into New River below Downey or not, he thinks not, but has heard other people say the whole country was a lake from Compton over east of Clearwater. Says New river overflow never got closer than about a mile of Downey, and that was about east of Downey and in the 1884 flood.

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331
Jim Quill, R. F. D. Box 17, Downey, Calif.

Came to Downey in 1869 and has been in the section south of Los Angeles ever since. Says he lived on the Lugo tract near Bell Station, between Cudahy and Laguna ranch in 1872. At that time the San Gabriel was a very small stream with no well-defined banks, could drive across it most anywhere. There is a sand ridge leading off down from Downey and about 1/4 of a mile easterly of the Downey-Clearwater road, opposite the County farm and leading off toward Bellflower and on down towards Los Alamitos ranch, and some people think it was an old river bank, but he thinks it was caused by the sand blowing up against the mustard and vegetation. In the early times there were lots of sand storms from the west. He points out to support his contention a picket fence down toward Drum Barracks, west of Wilmington, that was about a mile long and four feet high, and was all covered up in 1870 and 1871 and those were both dry years. He thinks the rivers are just as liable to go one place as another if something is not done to take care of them. Since he saw the

Los Angeles River in 1889 he would not be surprised at it going anywhere. There was no comparison in the 1889 flood and the 1914; the '89 was much larger. Watts and vicinity was swampy and boggy and tullies in early times.

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331
Frank Burke, Downey

Mr. Bruke has lived in Downey all of his life, and that is about 50 years. His place is about one mile west of Downey. He had about 60 acres of trees, principally walnuts washed out. The water whipped around them and bent them over, and then covered them up. The ground was filled with sand from one to three feet deep and he is not trying to do anything with it, and thinks it will be years before it is of any value. The bed of the river is in a very bad condition, worse than he has ever seen it. The bed at the Bangle property is very bad, and the water is liable to go out there, and down through Downey. He says there should be some temporary work done, that by spending a little money even if the work was afterward thrown away, might save the property owners thousands of dollars. He says he understood the county was raising some money by special tax for temporary relief, but they don't seem to be able to find anything out from the Supervisors, and it is getting about time they commenced if they expect to do anything this coming season. He says the Rio Hondo improvement shows the Foster bridge was doing all right until the Foster bridge got jammed with trees, logs and everything else. Says not a pile of the improvement work above the bridge gone until the bridge got clogged up, and the bridge would not have clogged if it had been a suspension instead of a pile. When the bridge went out a good deal of the work went with it, but there is a great deal of good stuff left, he thinks, that could be repaired with wiring, and would be a great temporary help. He says the velocity of the water is a great deal more than the engineers seem to give it credit for. He has stood out and watched piles and driftwood come down stream at the height of the flood and he says he doubts if a horse could run fast enough to keep up with them.

The engineers claimed the Rio Hondo would not wash up above the Rio Hondo bridge, but it did; that the wire was put right as far as it could be on the piles when the work was done, and now you can walk under the lower wire on quite a lot of it. He thinks the 1914 flood was about as large as he has seen. It probably did not flow over as much territory as the 1889 flood, but did more damage, especially along San Gabriel river. He remembers when the Los Angeles river ran over under the bridge on the S. P. to Santa Ana, and over in that vicinity and toward Watts was swampy and sloughs, has shot ducks in that country. They used to figure it took 24 hours for the water to come from San Gabriel Canon to their section, and he thinks it was not more than six to eight hours in the 1914 flood.

The greatest cause of the overflow and damage is caused by the way the railroad bridges and wagon bridges are built. If you take all the piles and obstructions out of the river, you have done away with most of the cause of the damage. He thinks the floods can be taken care of if if is gone at right, and he would like to see the

Rio Hondo turned into New River up above El Monte. He says a channel of two or three hundred feet, if straight and no pile bridges allowed across it will carry all the water. He has his doubts about their being able to take the Los Angeles river over into Los Alamitos Bay. He is interested in the Gun Club down by Signal Hill and says the Gun Club takes care of their flood water by running it to San Gabriel, just the opposite direction, and about the same place the engineers propose to take the Los Angeles river to Los Alamitos Bay.

Mr. Burke says they will tell you water will find its own level, but nevertheless, when the river is up and running with a strong current it is much higher at places than the surrounding country. For instance, he says he was at the Foster bridge in the 1914 flood and saw the water running over the flood of the bridge and he knows that is higher than the approaches and some of the surrounding places, which were not overflowed at the same time.

334
George Brown, Artesia

Was seen at his ranch on Artesia Road about 1/4 of a mile west of New River, Sept. 11th, 1914 by R. A. Borthick.

Says he came to this part of the country in 1884 and has been here ever since, and he thinks there was more water at one time in 1914 than in 1884 and 1889. When he first came here the New River was running about half a mile west of where he lives, and it went over where Bellflower is at present in 1889, and stayed there for two or three years; and then came east about 1/4 of a mile east of his home, and then is when they made the official channel. So far what overflow he has had done him no damage, but was a benefit on account of drowning the gophers and fertilizing the land. He had about 40 acres overflowed in the 1914 flood, and he says where the river originally flowed was not overflowed in 1914 at all. Where the overflow does not cut or fill with coarse sand is a benefit.

The country in the Bellflower district was in willows and brush and has filled from three to seven feet a distance of some 1 1/2 miles wide, and he does not know how long, and it made good ground out of stuff that was of no value before it was filled. The pile bridges make it very near impossible to care for the water in the river channels. When a rush of water comes it keeps the sand in the channel cleaned out, and when there are light rains it deposits the sand and fills the channel and makes sand bars. He says the present channel of the New River in the Artesia district will not carry all the water when there are heavy floods as in 1914. He doesn't know how large a channel it would take to carry all the water in as large a flood as 1914, even if they did not throw the rivers together. New River down toward the ocean has filled up very badly with sand.

He says when they first came to the place where they now live there was an old apple orchard just west of him and they were old trees at that time, and in the 1884 flood the ground filled up about

four feet, and they dug the dirt from around the trees, but they all died.

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335
J. D. Gaines, 3rd Artesia

Mr. Gaines was seen at his home on Third St., Artesia, August 27, 1914, by R. A. Borthick.

Says he was born in El Monte in 1861 and has lived in the country ever since. Says he lived in Green Meadows years ago when he was a young man and hunted for the market, and he says that section of the country was more or less damp and swamp and covered with salt grass and the Compton water belly deep to a horse in the roads of Compton, and has seen Clearwater under water for miles. Says it was a lake of water, from Santa Ana river to Los Angeles river down below Hynes. Bellflower was nothing but a swamp along about 1884 he used to hunt ducks in that section of the country and the water would stand in sloughs and lakes did not drain themselves.

He says he did not go from Artesia to Compton in a boat in 1884 as Mr. Carse said, but has no doubt that you could have done it by going around some few sand ridges. Says he did come from Alamitos Bay in a rowboat up to Artesia--came right around the end of Alamitos Bay in a rowboat around the end of Alamitos bridge and on up through the country and he was not in the bed of the river any of the time. Says he has never known Artesia to have flood water from the river before to his knowledge. They had flood water but from a slough or swale that used to come down from Little Lake, but no river water until 1914.

Says he does not know whether they can ever do anything with the flood waters on account of the sand it carries. If the sand could be gotten rid of they could take care of the water. He thinks a channel 200feet wide or the same size of the present one will take care of water if it can be kept clear down below and get a little more depth to it.

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336
John Condren, R. F. D. Box 74, Gardena

Has just completed a new pumping plant on the corner of Lemon and McKinley Ave., East Gardena.

He has a 16" casing down 201 feet and a pump that works inside the casing that can be lowered by putting on an extra piece of discharge pipe.

He has his pump down 70 feet at the present time and when pumping the water stands about two feet below the pump. He is pumping about 125 inches at present. Says the surface water is about 37 feet down, but he did not cut the well at surface water. Main

water strata is 170' and it comes to the surface water when not pumping.

Says he has his surface water cut off entirely. It does more damage than good. Claims it spoils his other well. He says a few years ago the water would flow in the well about 800 feet south of him--elevation practically the same. The water level is lower this year than any time since he had anything to do with the well in this locality, or about eight years.

He says it is the first time wells have ever played out in this section, and that the wells just below him that have old style pumps cannot prime their pumps unless he closes down. He says there is a strata of clay mixed with sand just below the surface water, but he says that varies as to depth and lays on a slant and is badly blocked and broken up.

He says a man about one-quarter north of him put down a well and got sulphur water so bad he could not use it and put down another well just a little way from the sulphur well and got good water at about 180 feet. The sulphur well was a little deeper. He says the formation is very badly broken up in this section.

No ford water in this section.

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337
P. G. McGaugh, Rivera

Mr. P. G. McGaugh was seen at his ranch on Passons Blvd. 1½ miles north of Rivera, September 1, 1914 by R. A. Borthick. Says he has lived here since 1869 and has seen the flood spread out much worse in 1884 than at any other time on the old San Gabriel river over toward Los Angeles. Says there was some overflow just north and west of Rivera in 1884 and 1889--something like up to the hub of the wagon, but it soon ran off and there was no particular damage done. Says there is a swale or low place through the country just north and west of Rivera. The people in this section on New River have been trying to take care of the overflow water since 1885 and have kept it from washing away the ground to a large extent.

He says he is strongly opposed to trying to put all the water in one river. Cannot take care of the water and if they could it makes the danger too great. There are times when one river cannot take care of all the water and it is not fair or right to try to put it all in either channel.

The main channel should be about 100 feet wide and six or seven feet deep and the right of way 300 feet. Says the New river from Santa Fe bridge north is in practically the same place as when he came here. The only changes were made by the people in straightening the channel and taking care of it.

He claims the majority of the damage and trouble with the overflow water is caused by pile bridges of the county and railroads;

if they will remove all pile bridges they will remove most of the cause of damage.

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338
John Hight, Compton

Came to Compton in 1887. Has lived there ever since. He owns property on both side of Long Beach Boulevard just one mile south of Main Street.

His place was flooded about one to two feet in 1889 flood, and in the 1914 flood his lower ranch was covered two to four feet deep, but on what he calls his home place, which is on the west side of the boulevard, there was only two to three inches of water in 1914.

According to him there was a great deal more water in 1889 than in 1914. Says the water went to the hills on the west side of Wilmington St.

He had one large channel cut the whole length of his property about eighty rods east of Long Beach Boulevard, and practically parallel with it, an average of 89 feet wide and six feet deep, and small lateral ditches and washes, and there was another large ditch cut about one-fourth east of this one.

He says ground rented for $40 per acre on either side of him.

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338
L. O. Funk, Compton

Mr. Funk lives on Main Street just east of Gibson St. on the north side of Main St., just east of the city of Compton and forms 264 acres and has farmed it for about twelve years; has had more or less water during all heavy rains but damage has always been nominal. He estimates his damage for 1914 from $25,000 to $40,000 counting land crop and labor he has expended in trying to clean up the same. It cut gulches and washed out about 40 acres and filled a large portion of the rest of the ranch with sand.

He had four wagons washed away and one he has never been able to find. He would be very much in favor of trying to do something with the flood waters and says most of his neighbors are in the same frame of mind.

He says if the county had a channel wide enough and as straight as possible and if the banks were planted with willows or otherwise protected the water could be taken care of.

He says if it had not washed out one of the high line power towers on Gibson Road and turned the current of the water back from across Gibson road, it would have run on down toward Compton and across Long Beach Boulevard into Compton. Says it was headed that

way in behind the schoolhouse but the tower went down and turned the current back down South.

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339
Dr. A. L. Holcombe, Compton

Came to Compton in 1888. Has lived there ever since. He says the water has overflowed Compton three times since he has been there and the 1889 flood was no larger than the 1914 flood but there was not the same amount of obstruction and the water spread worse. Says in the 1889 flood Brinkerhoff came down the Compton road in a boat from his place on Compton road near Willows, but he thinks that the water came from the slough west of Compton. He was a doctor practicing in Compton in the flood of '89 and he had to use a saddle horse to get over the country and some places he could not get with a horse.

Says the water from the river got to the S. P. tracks on Main St. in Compton in 1889. The river went over into Nigger Slough in '89 the water went around the point of the hill just below Los Angeles St. and followed down the swale that shows very plainly on the ground. That was the year he claims the carp went into Nigger Slough and when the water a few years afterward commenced drying up they had to clean the fish up and burn them on account of the stink.

He says the water in Compton in '89 was from one foot deep up and would have been the same way in 1914 if the P. E. had not blocked the water from the slough west of Compton.

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340
Mrs. John Gaines, Compton

Mrs. Gaines came to Compton in 1872 and has lived there ever since. She says she was not in the 1867 flood but she had a sister (now dead) that was, and she told her they could not get out of their place for six weeks. They lived on Olive St. between Temple and Gibson Sts., right near where the river ran at that time. Said she told her she could see no dry land with the exception of a small strip lying along Gibson St., right near where the river cut out in the 1914 flood. She said the men had to wear boards tied to their feet to keep from miring down. There was a bad flood in 1876 which cut up the country very badly around where Lugo is at present; cut great gulches and the people throught the ground would never be any good, but it gradually filled up and made good ground. She says that they used to have more floods than now but they did not do any damage as at present.

She says Mr. Carson came up from Dominguez in the '67 flood and got the Rogers family out of their place. Did not know whether he came in a boat or not but her sister said the water was waist deep. Mrs. Gaines says there was more water in 1876-1884 and 1889 floods than in 1914. She says she remembers the 1889 flood mighty well because her son was married at about the time the flood came.

Says they went from Compton December 24, 1889 to Mr. Atwater's in Clearwater and they could not get back for a week and then at the risk of their lives.

Says in 1884 there was a big cut made on the Harris property (this property is on Olive between Temple and Gibson) and they cut a lot of trees and used tons of hay to keep it from cutting farther over into his property.

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341
Henry Wilson, Compton

Mr. Wilson was born in El Monte in 1862 and lived in El Monte six years. Came to Compton in 1868 and with his father. Says he was too young to remember much about the 1867 flood but has a good recollection of the 1884 flood. Says he crossed from Downey to Compton during the high water and all the bridges were washed out and the water was over the majority of the old Tweedy Ranch and he went up as far as Florence and over to New River. Says he followed the S. P. R. R. and crossed the river where the S. P. crossed it. The bridge was washed out and he crossed the river by using a board and swimming. Says he helped a Dutchman out of the quicksand about halfway between the river and Compton on his trip to Compton. Says the man took a dry looking piece of sand for ground and he went up to his arm pits in the quicksand, and he cut willows with his pocket knife and used driftwood and by working about two hours he finally got the man out. He says he was in water all the way from Downey to Compton. According to him, there was much more water in 1884 and 1889 than 1914.

He says that before 1884 the San Gabriel river where the steel bridges are and what they call the river was not much more than an ordinary creek, or twenty feet wide.

The 1914 flood did not get up in Compton like the 1884 or 1889 floods on account of the railroads. He says on the west side of the P. E. R. R. Compton was overflowed very badly but not from the river water. The water came from the slough west of Compton which drains the southwest portion of Los Angeles City. He says the water was from one to three feet deep from the P. E. Tracks to the slough. The water could not get across the P. E. on account of the size of the culverts. He says the whole valley was covered with willows in 1884 and 1889 floods and the waters did not wash the way they did in 1914.

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342
Henry Rogers, Compton

Mr. Rogers lives in Compton between the S. P. R. R. and the P. E. R. R. on Magnolia St.

Came to Compton in 1867 and at that time lived on Olive St. just a little east of Long Beach Blvd. He says the Old Los Angeles

river bed at that time was about 1,000 to 2,000 feet east of Long Beach Blvd., and joined Compton Creek about at the point of the Dominguez hill, and in the flood times ran around the hill into Nigger Slough in the 1867 flood.

He says the County of Los Angeles built the S. P. Line of R. R. to Wilmington and afterward sold it to the S. P. and at the time it was built the Los Angeles river ran across the track below Dominguez Hill. Says there were two large swamps at the Bullis place which, according to him, lays between the P. E. R. R. to Long Beach and the S. P. to Wilmington near Watts, and one large swamp on the Jim Bullis place which lay east of the S. P. tracks.

The Los Angeles river was west of what was known as the Missouri settlement which was west and north of the County farm and in 1867 it was completely washed out, that is, some of their houses and all of their hogs and provisions. He says they had lots of ponds with catfish and other fish in them and they were all washed away. The old channel of the Los Angeles river was filled up in 1867. And he says it very nearly got back to the old channel in places down near Dominguez and cut a new channel in 1914.

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342
H. B. Sheilwachter, Compton

Lives at the N. E. corner of Orange and Compton Ave. Has lived there twenty-eight years. He was there in the 1883 and 1884 floods and he says the water at that time was nothing to compare with the 1914 water in that neighborhood. He says it was a lake from one to two and one-half feet deep in Compton Road down as far as Main Street, then down the course of the slough which is south-east from the corner of Main and Compton Road to Domingues orchard and over to the P. E. tracks to Long Beach; the water could not get across the P. E. tracks they say on account of culverts not being large enough.

He says the water they got did not come from the river but from Los Angeles city. He says it comes from as far over as Agriculture Park district, and he says the majority of the water they get now used to go to Ballona.

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343
Mr. J. F. Lasswell

Lives on Compton road and Main St. Has lived there about thirty years and was present when I talked with Mr. Sheilwachter and confirmed what he said.

His place was not overflowed, with the exce ption of where the slough runs across the corner of it.

They seem to think the water did no damage in that section, in fact, was a good thing on account of drowning squirrel, except it made some of the crops a little later. They say the Bob Sherer place, which lays along the Compton Road and Main St. was damaged some on account of drowning out one crop of beets, water stood on the ground so long. Same thing on a piece of ground just north of Compton Road and east of Main St. about a forty acre piece.

They say that they have heard from old-timers the Los Angeles river did at one time run over into Ballona up above Florence.

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343
George Engelhardt, U.S. Custom Inspectore, San Pedro

Mr. Engelhardt was seen at the United States Custom House September 3rd, 1914 by R. A. Borthick. Says he went to Verdugo Canyon in 1882 and when he went there there was not much of a wash there at that time. The road was running about where the wash now runs and you could travel it most any time. Says there was a big flood in the canyon in 1884 but the water soon ran off right away. Did some cutting but nothing to hurt much, but in 1889 there was an awful flood. He lived right near where the Homes Walton Pumping Plant is at present and a wall of water twelve feet high came down the canyon in front of his house and he says it brought a stone that would weigh any way from ten to twelve tons and lodged it a little piece below where he lived and that choked the stream and spread it more or less and it washed the road out completely and he could not cross the stream for three days and then had to do it on horseback. Says the Glendale people had to build a protection down at the junction of Glendale Ave., and Verdugo Road to keep the water from going down Glendale Ave. They set posts and nailed planks on them to turn the water. After that flood he made the road around by the hillside about where the Verdugo road is at the present time. He was road overseer at that time. Water continued to run very large for a long time and there was quite a lot of water in the stream for three or four years after that. Says he used to take out water above his place and irrigate to about four or five yeqrs after the 1889 flood and the stream ran very strong for several months after the storm.

The bridge across the Verdugo Wash at San Fernando road was washed out in 1889 and also the railroad tracks of the S. P. and that whole section down around the San Fernando road was flooded. Says he has not the records but he knows it rained more than sixty inches in 1889 in the Verdugo Canyon.

Says he has seen the Arroyo Seco full from bank to bank at Devil's Gate. That is, the banks were full just north of Devil's Gate, also at the bridge at Ave. 20. One end of the bridge was washed out in 1889. All the bridges across the Los Angeles river were washed out in 1884 with the exception of the Aliso St. bridge.

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345
Samuel Hunter, Tropico, Calif

Was seen at his son's place on San Fernando Road, Sept. 15, 1914 by R. A. Borthick. Says he came to this country with his father, Captain Hunter in 1851. He was in Antelope Valley in 1867 and says he doesn't know how much it rained in Los Angeles but it rained for forty days in Antelope Valley and the country was so wet and full of water you could not drive a team on the road or anywhere else for more than a month.

In early times the lower country all down through Compton, Clearwater, Watts, Gardena and the Cienego ranch and Ballona ranch was swampy and more or less subject to overflow. There were sloughs, standing water and tullies and you could hardly drive through the country in winter time. There were several hundred acres in Burbank that were swampy and tullies and too wet to cultivate, and there was quite a lake near the old Burbank ranch house over next the point of the hill near Cahuenga Pass. That section was ditched and drained some fifteen or twenty years ago. He says after they commence to irrigate the San Fernando valley with the Owens river water, the country where it was damp and swampy will have to be drained again in a few years.

Says there was considerably more water in the Los Angeles river in 1884 than in 1914, but there was not so much cutting. If there was nothing said about it, the ground was not very valuable-- about $8 per acre, and if there were a few acres washed away there was nothing said about it. He thinks the only thing they can do about controlling the rivers is to own a rightway and make it as straight as possible, some 300 to 500 feet wide and keep it clean of all brush and everything else, and jail a man if he throws any brush or rubbish in the channel and keep the banks in willows; it will overflow then in a big flood time but will not do any or much cutting or washing. Mr. Hunter says they can all tell what the river has done but none of them can tell where it will go or what it will do.

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346
M. J. McGaugh, Norwalk

Came to Los Angeles County in 1869 and has been here e ver since. Went to Ranchito or what is now Rivera in the early seventies, and rented some ground and planted corn, and while the corn was growing, himself, brother and uncle got on their horses and rode all over the lower end of the valley, looking at the country and they came to New River right about where Summerset or Bellflower is now, and the river at that time was a shallow wash and about as wide as a street and no depth to speak of. Says he bought 27 acres of land lying along the edge of the river in Summerset in 1879, and the piece of ground lay right across the street from where the gas plant is in Bellflower at the present time, and lived there for twenty years. Says the New river changed its course in 1889, commenced about two miles north of Bellflower and went east from one-half to one mile. Says the water caught them in 1889 and they had to get out of the

house and go to a neighbor's house which was on a sand ridge and not under water, and it was too weeks before they could get out to Norwalk. The water was from two to four feet deep all over his property, and the water got up in his house which had been built up pretty well.

A team could not pull an empty wagon against the current in the road. It was a river from Studebaker half way to Downey in the 1889 flood. Says he got up about thirty feet in a weeping willow tree at his house, which is about east of Compton, and looking toward Compton he could see no land but the hills, and looking east there was no land in sight.

Says the Los Angeles river, San Gabriel river, and Coyote Creek and Santa Ana river flood waters all practically joined one another about three miles south of Norwalk and just a little below Artesia. Water was from hill to hill.

He says if you dig in the swales or between the ridges in Norwalk which run north and south, some three feet, you will strike river sand.

Says he has fought the river for several years and does not know whether it can be controlled or not but thinks it could and should be tried. Says the 1914 flood was small in comparison with 1889.

He had an apple orchard of seven acres in Bellflower before 1889 flood and took an average of $10 per tree off the orchard. It was killed in the 1889 flood.

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347
Strong, Norwalk

He is the son of J. J. Strong, has lived there all of his life, some 26 years. J. J. Strong's place is on the corner of La Mirada and Galena Ave., 1 1/4 miles southwest of Norwalk. They got some water from the river on the southwest forty acres of the ranch, which never happened in his recollection before, that is, it was moving swiftly across the field. He has seen backwater on this ground before. He says the river water had never gone into Artesia before in his time. In the 1914 flood it followed the P. E. down and got high enough to get in some of the stores.

He says the New River used to be down through Bellflower, or about a mile west of where it is now running. Says if they do not try to put all the water into New River thinks they can control it. He thinks the building of dams and reservoirs will come nearer to taking care of the excess water than anything else. He says if the water could have been held back six or eight hours the water would hardly have gone out of banks. If there had been no pile bridges he does not think the water would have stayed out of banks six hours. E.

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348
E. P. Truitt, Editor, Norwalk Call, Norwalk

Came to Norwalk in 1893 and has been running a paper in Norwalk for 29 years. Says Norwalk has never been bothered with flood water from the New River. There was a small quantity of water came from New River in 1914 and made quite a lake where the oil tanks stand by the S. P. R. R. and went about out to Good roads, was probably one foot deep. Says that the water did not get closer than a mile southwest of Norwalk, the closest point was Stanton Powers' place, the water broke out from New River and washed out a road probably three feet deep and gulches across his place. He says there were others in that neighborhood that suffered, but his place seemed to be damaged most. Thinks if the whole country took hold of the proposition the flood waters could be taken care of.

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348
J. S. Elliott, Norwalk. F. L. B. 10 - 10p

Has lived in Norwalk since 1869. Says he camped at the foot of the hills near Whittier in 1859. There was a little mill that stood there at that time. There was lots of stock, cattle, horses, sheep and goats, and plenty of feed, but no settlers with the exception of Mexicans. The Mexicans told him there was always lots of rain and good feed for the stock.

He thinks the floods of 1884 and 1914 were about the same volume in Norwalk district, and there was no river water here either season he claims. Says the river could be taken care of it straightened and banks made to carry the water. Says if you throw the river all together and empty the waters into Los Alamitos Bay, and a high tide and flood should happen to come at the same time, you could cover the whole country below Clearwater and down that section, and the best sugar beet factory out.

Says he knows a man in Rivera that told him the water was up to his armpits in the 1867 flood in Rivera. Says the water was from Coyote Creek to Bixby Hill in 1884. He thinks the old San Gabriel side of the valley got the worst of the flood in 1889.

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349
W. H. Hughes, R. F. D. #2 Norwalk

Lives at Studebaker, on the S. P. Ry. to Santa Ana. Came there in 1875 and has lived there ever since. He lives in the 3rd house North of the S. P. Says he has seen much more water than in the 1914 flood. His place backs up on New River, and was not damaged much in the 1914 flood, but the water was two and one-half feet deep on the place just south of him. He says there was a great deal more water in New River in 1884 than in 1914. He says the 1884 flood the New River came near going off down through Santa Fe Springs, and on down through Norwalk, it came near breaking out about three miles

above the S. P. Bridge across the New River near Studebaker. Says there was some water went off down there in 1884, and in his opinion if nothing is done that is where the New River will go some of these times. No water went down that way in 1914.

He says the bed of New River is about the place north of here ever since he knew the river, will run to one side one time and the other side another time. But below here he says it has moved some to the east. He does not think any of the water from New River went over into Hynes in 1884, thinks that the water was from the San Gabriel. He says the 1884 flood was the largest since he has been here, but the 1889 flood was larger than the 1914 flood. He says he has lived on the river and watched it for quite a while, and he does not think there can be much done by planting willow or banks for protection; he has seen too many of them washed out. He has serious doubts whether the water can be controlled. Says he stood on the river during the last flood and watched a pepper tree fully 2 1/2 feet in diameter washed out on the opposite side of the river, and the whole tree disappeared in the quicksand and the water and did not show up again for 400 or 500 feet, and lodged there and stayed there, and he says what good would willows be in a case of that kind. Says the County did a lot of work several years ago at his property, when Davis was Supervisor. They drove piles and strung a wire on same to throw the water under the S. P. bridge, and the first freshet that came took it all out. The County ordered the work and paid for it. He and his neighbors furnished the teams and done the work. And a man that owned the property on the other side of the river sued him and three of his neighbors for $2500 for turning the river on him, and they had to fight the case, as the county would not protect them. They won the case, but had to stand the expense of lawyers.

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350
T. P. Drinkwater, Limita Ave., Glendale

Was seen at his home on Lomita Ave., Glendale, Sept. 15, 1914 by R. A. Borthick.

Says he came to Riverside in 1881 and has been in the country ever since. The 1884 and 1889 floods were both much larger than the 1914 flood. He was living in Riverside in the 1884 flood and the Santa Ana river did considerable damage. There was quite a flood in 1893 and he lost 40 acres of alfalfa on the Santa Ana river bed near Riverside also some large orange trees. The ground has never been of much value since. He was offered $200 per acre before it was washed out.

The whole country was more or less flooded in 1884 and 1889. Could not say as to just what particular sections were under water.

In the early times when they were settling up the country around Riverside the water courses were all more or less changed and not much attention paid them, so for several years they had a lot of trouble with water in the flood times, but they have got it in fair shape at the present time.

The taking care of the river channels is a big job and hard to do anything with them on account of the sand,about the only thing to do with the river channels is to buy a right of way large enough to carry the water and make it as straight as possible and keep it clear of everything and encourage the growth on the banks of the streams.

Says as long as the old timers owned the land next the streams there was not much trouble. They did not try to clear right up to the banks and cultivate, but new comers always clear out the willows and brush on the banks and cultivate right up to the edge of the streams and then there is trouble.

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351
Jacob Kuhrts, 1103 Araphoe, Los Angeles

Mr. Kuhrts was seen at his home on Araphoe St., August 31, 1914, by P. A. Borthick. Has been in this country since 1851. Says the big flood years were 1851-52-62-63-68 amd there was no comparison with these floods and the 1914 flood. All of them were much larger than in 1914. He could not say as to what particular section was flooded except all over the whole of the low country. It did no damage because there was nothing to damage except some stock that may have mired down or got drowned. They could tell nothing of any value only that there was much more water in the country in early years than has been in later years.

He says of course the water can be controlled but will take an immense amount of money--that to just throw up small dirt banks will not do any good. He doesn't see where all the millions are to come from.

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352
J. C. Denman, 335, W. 30th St., Los Angeles

Mr. Denman was seen at his home on 335 W. 30th St., August 31, 1914, by P. A. Borthick.

Says he came to the county in 1868 and bought the Nadeau ranch at Florence and stayed there until 1879. The Los Angeles river did not overflow the Florence or Huntington Park section while he was there, but there were no large floods while he was there--he came there after the 1868 flood.

Says in the 1884 flood the Los Angeles river broke out of the old channel down below Florence where the S. P. bridge crosses the river, and made a new channel. Says Compton, Watts and that section used to get overflowed more or less in the flood times. After the 1867-68 flood the willows came up very thick down through Compton, Clearwater and all the section that flooded. Says you could tell by the willows what had been overflowed.

There was not much damage in the early floods--nothing to damage; the country was a stock country until after the drough of 1863-64 when nearly all the stock died. Old man Sterns sold 18,000 acres of land for $160,000 just after the drouth. The 1884 flood was the worst flood he has seen. The floods have filled up lots of ground and made good ground of ground that was no good.

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352
George Foster, 2509 Houston St., Los Angeles

Was seen at his place of business on E. First St., August 21, 1914 by R. A. Borthick. Says he was born on the Foster ranch at the old ranch house right near Foster bridge across the Rio Hondo in 1858 and lived there until a few years ago. He remembers the 1867 flood very well and that was the year the New River broke out from the San Gabriel river, and he says after the New River broke it was only a short while until there was hardly any water running in the Rio Hondo, in other words it took nearly all the water after it was formed and continued to do so up to three or four years ago, with the exception of when there was very heavy flood and then the Rio Hondo would get quite a lot of water.

Says the Rio Hondo used to be much deeper than at present; when the Foster bridge was first built they could drive a four horse team under the bridge and sit on the seat of a wagon just about touching the bottom side of the bridge, and it has since been raised some three or four feet and you can just about walk under it at present. From Foster bridge up the banks were well-defined and it had quite a depth but from the Foster bridge down there was no well-defined bank and it always overflowed very badly. The country south and west of Foster bridge overflowed badly in flood season over as far as Watts and all through the Tweedy ranch and Compton country, but hardly ever on the easterly side. He says in early days the Watts country and vicinity was swampy and tullies grew all through there.

He has often heard old Gov. Pico say the Los Angeles river used to flow out through the Ballona country and also an aunt of his who died sixteen or seventeen years ago at the age of 116, whose name was Vicenti Lugo D'Porris, and who was the oldest daughter of old man Lugo, told him many times she had seen the water go out through Ballona. He says she was born in this country. They can control the flood water if it is done right, and it should be done. The right of way should be one-quarter of a mile wide anyway and as straight as possible and all obstruction kept out of the bed. The cause of the damage is from cow fences and pile bridges and railroad bridges and culverts and people trying to gain a little ground.

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354
Obed Macy, 315 N. Los Angeles St., Los Angeles

Was seen at his place of business, 315 N. Los Angeles St., September 14, 1914, by R. A. Borthick.

Says he came to the country in 1850 but has been in the city most of the time since and could not say as to what part of the country was flooded in the early floods. There was nothing to be damaged and they did not pay much attention to where the river flowed; about all they would notice was that it would change and run almost anywhere. The stream did not have any beds to speak of and just wandered about through the county and country. The country was a stock country and the plain or lower part of the country was covered with mustard and the foothills and El Monte Country with willows, brush and elder bushes, and the water would spread out through this and do no particular washing.

There were only two orchards--that he knew of when he first came here--one was the Wolfskill orange orchard about where the S. P. Depot is and a pear orchard in El Monte. He seems to think the rains in the later years are about as large as those of the former times.

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354
J. H. Barclay, San Fernando

Was seen at his home on Porter Ave., San Fernando, Sept. 15, 1914, by R. A. Borthick.

Came to the county in 1871 and came to San Fernando in 1880. When he first came to San Fernando the washes were not nearly as wide as at present. There was only one opening left by the S. P. R. R. for the waters of the Tujunga, that was at about the present opening nearest San Fernando, and the opening was about 22 feet wide and the ditch or canyon was some forty or fifty feet deep. At that time most of the waters of the Tujunga were running over next the hills and down toward Burbank and on down between Burbank and Lankersheim into the Los Angeles river, and the S. P. R. R. built a dam from the opening up toward the point of the hills to turn the water and keep it from going over next the foot of the hills and down between Roscoe and Burbank and flooding the road bed in that section. The old dam is practically all gone but it can be traced yet.

He says he thinks it was 1870 when the road bed was first washed out and they had to put in an 800 feet pile bridge down toward Roscoe and the road was also washed out up near the tunnel. Again in 1884 the majority of the tracks and road bed were washed out from Roscoe to Pacoima Wash. There was a sheet of water from Roscoe to San Fernando. He says Wilson Canyon is the worst waters they have had to contend with in San Fernando. They formed an assessment district and built a concrete ditch but it did not carry the water and did no good, about all of the ditch is gone, washed out in the 1914 flood. He formerly lived in Wilmington before he came to San Fernando and says he has seen the whole lower section of the country from Compton to the beach a sheet of water and it went over east as far as you could see. He thought as far as New River. He says he has seen several bigger floods than the 1914 flood.

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355
Robert Tweedy, Route 3, Box 481, Los Angeles

Has lived on Tweedy road all of his life and is about fifty-five years old. He says he has seen the water of the Los Angeles river spread all over the country in 1884 and 1889 and both years were much larger floods than 1914. The 1914 flood did not get on his property (which is about one mile east of Long Beach Boulevard on Tweedy road).

He says he does not have any recollection of any of the flood waters of the Los Angeles river ever going into Los Alamitos Bay. According to him, the county is undertaking a big job when they undertake to control the flood waters of the different rivers. Says he had a flowing well about twenty years ago one hundred and fifty feet deep and flowed a good stream--not used that well now. He dug another well 755 feet deep and the water comes to the surface in the winter time, but in summer when the people start to irrigate, the water drops down about fifty feet below the surface. He pumps about seventy-five inches. He thinks the water level is a little higher this year than last year.

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356
Walter Wilkins, R. F. D. 4, Box 961, Los Angeles

Mr. Wilkins is road boss of Green Meadows District.

He lived in the Gardena in 1889 and says that Gardena was not flooded to any great extent then, but he says south Park Ave. from Manchester two miles south was flooded for about a week in 1889. The whole country was a lake from Vermont Ave., to the Los Angeles river from Manchester south to Compton. There was no road on South Park Ave., then, and the water was from six inches to two feet deep. He says he drove the road every day for a week, and the water stayed here for a week. He says in the 1914 flood there was no water on South Park Ave. that the gutters could not carry. He says the worst damage of the 1914 flood in his district was on Harbor Boulevard or Main St. near 92nd St. The water was from one to two and one-half feet deep and on the other side of the street in the car-line the water went in some houses. He says the high water in this section was the fault of Homeward Ave car line not having large enough culverts at about 94th St.

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357
George Aiken, 42nd and Central Ave., Los Angeles

Talked with Mr. Aiken and Mr. Kincade at the home of Mr. Aiken, 42nd St. just east of Central Ave., August 12, 1914.

Mr. Aiken lived in Lugo from 1883 to a few years ago. Says the waters were much larger in 1884 and 1889 than in 1914. The waters of all the rivers got together from Compton south, and going from Downey to Compton there was water practically all the way. Says he

knows the water was from San Gabriel river to Slough west of Compton. Mr. Aiken and Mr. Kincade are in favor of trying to control the water of the rivers, and they think they should be put in one large channel and riprapped from the mouth of the canyon to the sea, and made as straight as possible.

Mr. Kincade owns a ranch of about 94 acres close to Lugo Station on the P.E. to Santa Ana and has owned it since 1886. Says his place was flooded much worse in 1889 than 1914.

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357
E. H. Myers, Haynes

Has lived in Hynes and Downey since 1887. Says he was working on the section for the S. P. R. R. on the Santa Ana branch in the 1889 flood, and nearly all the Santa Ana tracks were washed out at that time. According to him, there was no comparison in the size of the 1889 and the 1914 floods--the '89 flood was much the largest. He says after the '89 flood he used to seine for fish all through the Hynes and Clearwater section and east of that in the sloughs and lakes and has caught lots of fish, some carp weighing as much as eight to ten pounds. He says he helped a house to be built on Ocean Ave. in Hynes about 1892 and they had to cut willows and tullies to get a place to set the mortar box. Bellflower was the original bed of New River and used to all be covered with willows. He has cut four cords of wood a day right where Bellflower stands. He says Artesia used to be a fine apple country and the flood killed all the trees and now they have to raise beets.

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358
G. N. Wheat, Hynes

Mr. Wheat runs a blacksmith shop in Hynes on Ocean Ave., and has run a shop there for twenty years. Says that 1914 was the first time since he was here that there has been any water to hurt at Hynes. The water was about one foot deep in his shop in 1914. According to him, the water came from the San Gabriel or northwest and ran southwest. He says in that section the whole country from the river to river was flooded, with exception of a few high spots.

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358
George Harris, Hynes

Lives on the corner of Artesia and Ocean Ave and has lived there for twenty-five years. Says the 1914 flood was the largest amount of water he has seen since he lived there--says there may not have been any more water but it was worse on account of the R. R. embankments and bridges.

According to him, the flood waters should be stored in natural and artificial reservoir sites and used for irrigation purposes in

the summer time, with cement conduits to carry off the surplus waters, and use the same for irrigating mains in summertime. He says it will not be many years before the underground supply of water gives out in this section. He says he has a well that used to flow three inches three feet above the ground all the year round, and now it will flow about one inch at the surface of the ground in winter time only--in the summer time when pumps commence to work it goes down about fifteen feet below the surface.

He says that if the flood or waste waters are not caught and used to replenish the underground flow, in twenty-five years there will be no irrigating waters. He says the 1914 flood did not help the underground flow. (Mr. Harris is old and childish)

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359
Mr. Jotham Bixby, 1800 E. Ocean Ave., Long Beach, Calif.

Mr. Bixby was seen at his home by F. Z. Lee this afternoon, October 13, 1914. He says:

I came to Los Angeles in 1866 and soon acquired some of the land I now hold around Long Beach. The flats between Long Beach and San Pedro, or between Los Cerritos and Dominguez, as it was in those days, was a mass of jungle. The valley was practically impassable except for two or three trails, and was covered by a dense growth of willows, weeds, briars, some blackberry vines, and marshes grown up with tullies. In those days there were bear in the valley, as well as other wild animals.

Immediately before I came here the old settlers often talked of the flood of 1860 which they said carried a great deal of water and flooded all the lower country. I have heard of the Los Angeles river once flowing out through Ballona; old Juan Dominguez had once told me of it, and also that the river once flowed right up against Dominguez hill.

I think that when the river changed its course eastward from Ballona it flowed against the Dominguez Hill, as that was probably the lowest side of the valley at that time.

The eastern boundary of my ranch was the San Jose Creek and the western boundary was the Rio Hondo, and also the boundary between my place and the San Gertrudes Ranch.

Up to 1867-68 the San Gabriel river was not known to have flowed into Los Alamitos Bay, but in that year great floods came, the greatest in my memory, and cut what is known as New River. The flood of 1889 again cut through to the old San Gabriel river, and I went up just below Rivera and attempted to turn the San Gabriel back into the New River channel, but my efforts were of no value at this point, in fact, were all washed away. However, higher up, the river again went back eastward into the New River channel, and we did nothing more about it. The San Gabriel continued to flow in this channel until 1913, when it broke out again into the old

river bed. The river is now changing rapidly to the westward, and the indications are that it will be flowing through Compton when the next big flood comes.

In 1867 the delta of the San Gabriel spread out into several branches and were up the valley about between the old adobe house on the north end of Los Cerritos and Dominguez. Below this point it was all a mass of willows and marsh, and used for grazing purposes. After this flood willows sprang up all over the valley, up around Compton, Watts, Huntington Park, etc., Before this time the cattle had grazed on the willows and kept them down. There were two or three very dry years between 1862-66 and thousands of cattle starved to death for lack of grazing. They had cleaned up this valley of its marsh growth for there were so many stock, but when the floods came in 1868 the willows came back again.

Terminal Island was known as Rattlesnake Island because of the great number of rattlesnakes that infested the island. Rattlesnake Island was entirely surrounded by water, and was only navigable to light draft vessels.

Only a few years ago I sold the low lands just west of Long Beach for only eight dollars per acre, as I believed it to be of no value whatever. It was used, in the summer time to make salt by letting the tides fill in the flats with sea water and then diking it off to evaporate.

The low lands east of Los Cerritos were after nothing short of an inland sea.

The flood of 1868 was the greatest I have known. There was no way into Wilmington, except by water for a month.

Since the sugar factories were built east of Los Cerritos they have been surrounded three times by floods. The Santa Ana River has over flowed into Los Alamitos Bay covering all the surrounding country.

In 1868 a great deal of trees, timber and debris came down the river. I piled up wood enough to do me for several years. If it was not for San Pedro Harbor I would say let the river go wherever it likes. It makes new soil and improves the land. It may wash some, but fills it up again. Wherever there are deposited only sand, it soon rots and makes rich soil.

Before the New River was cut by the floods of 1868 the only water that flowed into the Alamitos Bay from the Whittier Narrows was the San Juan Creek.

But I have seen the entire country flooded from the Dominguez Hills to Los Cerritos, Compton, Clearwater, Artesia, Downey, and in fact, all the valley. There were weeks when it was practically impossible to get around over the country there was so much water.

But those great floods and the smaller ones helped us. We rather eagerly looked forward to them because they fertilized the

land by leaving immense quantities of silt on the land. Out where the water had done nothing more than pass over the land it would leave probably a foot of deposits on the soil. We always thought they were good for us. But now, of course, when the floods cut up the land so bad some remedy should be had that would prevent the washing effect.

It is going to take a big channel to carry all of that water, however. Sometimes I doubt whether such a thing can be done when I remember that I have seen the entire valley between Long Beach and Wilmington covered with water.

As a close observer of what the rivers have done I very much doubt the advisability of the plan spoken of by the engineers of putting a levee or dam across from Dominguez Hill to Los Cerritos to stop the water from getting into San Pedro Harbor. It is all right to talk of dredging a channel across the north side of Los Cerritos to carry the water to the San Gabriel or New River. It will be more or less of a job of getting water to flow up hill.

We have observed the action of the New River and in all high water we have noticed that water from New River would break off almost at right angles just west of Artesia and flow almost west through the low, swampy land finally and emptying into the old San Gabriel river.

At this point where the river breaks westward it also breaks to the southeastward, and the river at the present time is almost a half mile east of the old channel.

The logical place, it seems to me, is to keep the Los Angeles river where it now is. There is a natural channel down through there and it would keep the river out of the lower lands below Compton.

Should a dam be built across the valley it will be a menace to the people on both sides of it. On the upper side it would tend to dam the water up, to back it over the land and drown the people there. There would not be fall enough to quickly carry the water away eastward, or to prevent the water from dropping its load of debris.

This would gradually fill up the valley until there would be a big bed of sediment above the dam, while below there would be a low place, which should the levee break and the floods get out of control, would inundate and ruin the country, besides filling up both the Long Beach and San Pedro Harbors.

The San Gabriel River and the New River should be turned i n together where New River broke out from the San Gabriel. Then the Los Angeles river could be turned into the San Gabriel along a natural channel which it is now following down through the Laguna Ranch.

This flood water could be made to build up and improve a great deal of land that is now of not much value. The poor and low land could be diked off, and this storm water allowed to run into

those enclosures and gradually run off, leaving its load of sediment to enrich and build up the land.

The floods over the land do not affect the artesian flow in the least. The source of the underground waters comes from the mountains and the higher altitudes.

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363
Mr. George H. Bixby, American Ave., and Bixby Road, Long Beach

Mr. Bixby was seen at his office by F. Z. Lee this morning, October 13, 1914. He says:

I was born in this section of the country; have many recollections of old times here, and of what many people have told me.

I once had a Mexican vaquero whose father had lived there all his life who said that all of the valley between Los Cerritos and Dominguez and San Pedro was one tangle of marsh willows, larch, blackberry vines, and other tangled undergrowth which was impenetrable. There was only one or two trails across the valley, and they were not safe for two reasons: on account of the undergrowth and bogs, and there were bears in the tangled jungle.

On both sides of Los Cerritos and further up the valley there were a great many springs in the side hills and peat bogs. These springs kept the country wet and of no value scarcely, outside of the water they afforded, as they were surrounded by tullies, willows and other brambles.

As the country became more settled and wells were sunk in the upper lands, there was less water and the springs flowed less and less until in the final attempt to drain the land, they used tile drains and the springs disappeardd. This drained land is now rich farming country.

I was a small boy during the floods of 1868, but remember well the accounts given by my father and others of those days. It was in this year that the San Gabriel broke over into what is now known as New River. Prior to this time the San Gabriel river had never been known to flow into Alamitos Bay. The only waters that flowed into Alamitos Bay from that section of the country were the La Puente and San Jose Creek.

However, in 1868 the San Gabriel broke through eastward and formed the channel between Rivera and Whittier, somewhere near its present location, which it has held ever since. In 1889, or just afterward, an attempt was made to turn the river back into its former channel, and I spent many thousands of dollars building a levee or dike, to turn the San Gabriel back to its old location, but in the storm of 1891 this work was all washed out and lost. No further attempt was made to turn the river back to its old channel.

In early days the Rio Hondo did not carry a great amount of water. It had a well-defined stream bed, and at certain places there were many deep holes where the vaqueros swam their horses to give them a bath and wash them off. The word "hondo" means deep in Spanish, hence those deep holes.

I was East in 1884 attending college, and was not a witness of the floods of that year. However, I understood that the Los Angeles river broke through the Laguna country and joined the Rio Hondo and the San Gabriel river.

The San Gabriel River had not flowed into the San Pedro harbor until 1912, when it again broke through to the westward.

The flood of 1914 I consider the largest since 1868, more water came down and did more damage.

There were three or four men who came down from the mountains formerly trappers and hunters, pioneers who came out here before the 49ers. These were Mr. Wolfskill, Mr. Barrows, Mr. B. D. Wilson and Mr. Guinn; men who have all made names for themselves among the settlers.

Mr. Wolfskill home was just above the Arcade Station, and the ranch extended southward to the lowlands. Mr. Wolfskill planted the first orange orchard in Los Angeles.

Mr. Barrows taught a private school in those days and was among the first teachers of Los Angeles. Prof. Guinn also taught school. Both Mr. Barrows and Mr. Guinn were greatly interested in the early history of Los Angeles and Southern California, and wrote a great deal upon the subject.

Up around the San Gabriel Mission, the Narrows, etc., I refer you to some of the descendants of pioneer days, such as Juan Matais Sanchez, Francis Temple, etc., on the east side of the Rio Hondo as being able, through their fathers, to tell how the rivers acted in those early days.

The well on my home place is between four and five hundred feet deep. The first water was struck at 55 feet in a water-bearing gravel. The well was put down to a clay strata, but was not carried through this strata. The wells were bored about 25 years ago, and it has been necessary to lower the pumps two times on account of the water settling, probably due to so much pumping being done in the valley. They are now lifting the water 107 feet. There are no indications to show that the supply could be exhausted.

I am thoroughly in favor of throwing the flood waters of the three rivers, Los Angeles, Rio Hondo and the San Gabriel into Alamitos Bay. I am satisfied it can be done and think it should be done. I think it will make rich land of all the low lands around Santa Ana landing and for those who can afford to wait, will make their land very valuable. There will not be much opposition and none from father. I consider San Pedro harbor first, and think it is a big factor in making the country.

The general plan talked of now, to put a dam across the valley from Dominguez to Los Cerritos and to force the water from there into Los Alamitos Bay has some features that do not appeal to me. Suppose they build a levee across there and catch all the floods, even though they dredge a channel eastward it is not going to give fall enough to create the necessary velocity to carry the big amount of sand and silt the floods bring down.

This then would be a sort of settling basin, and there would be fresh deposits left by each flood. It would not take long to fill up the low country north of the dam until there would be a high bank or mesa above all the dam leaving a low valley below it. That would prove to be a menace, for if there should come a flood big enough to break the levee, then there would be untold damage from such a flood. It would carry immense quantities of sand and silt on to the land below and fill up Long Beach and San Pedro harbors.

But, should such a levee be built it would be a curse each year to the people living above it. The water would back up over this land causing as much damage as it does now. It would, as I have said, leave its load of debris, continually filling the land, up, raising it a little higher each year.

When the valley was not cultivated as now, and the floods came, we considered them of benefit to the land, but now the country washes so much, and this makes it uncertain what the river will do.

My father and I have often talked of the proposition of fixing an official channel for the Los Angeles, the San Gabriel and New Rivers. It seems to me the Los Angeles River should be brought down near the County poor farm, somewhere near where it now is, and from there across to the San Gabriel river. The San Gabriel and New River should be run together higher up. In fact the water that comes down the San Gabriel, which is called Rio Hondo above could all be put over into the New River, and brought down as one stream.

A right of way wide enough to put a channel big enough to carry the Los Angeles river should be a thousand feet wide any way. The San Gabriel and New Rivers carry more water and should have a wider channel.

That is something the eminent engineers of this Board of Flood Control will have to figure out. It is an engineering problem and involves the volume of water, its velocity produced by the grade, etc., of which we have insufficient knowledge.

One great problem is to get these floods to carry their loads to the sea. People in that low land, for instance, Alamitos Bay, Anaheim Landing, etc., do not want to have their lands flooded. It would be too expensive for the county to acquire land to be used as settling basins for the flood waters, nor will people be willing to lease or allow their lands to lie idle for so many years, even though it does raise it up and increase its value.

Probably jetties should be built at the mouth of the channel

and the flood sent out into the ocean.

The embankments of the sides of the channel of the rivers could be utilized as roadways, and in that way maintained. The banks must be left free from gophers, for they are the greatest menace to embankments. The channel must be kept free from growths of willows and other such vegetation. It would probably pay to lease the land to sheep owners or to lease for agricultural purposes in order to lessen the expense of keeping down the growth in the channel.

The floods in the lower part of the valley do not affect the artesian wells. The supply is fed by the waters in and near the mountains. Water that is held up in the mountains and on the gravel beds at the mouth of the canyons feed the supplies some, but the great supply comes from away back in the mountains.

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368
George H. Peck, 1315 West Adams St., Los Angeles

Was seen at his home by F. Z. Lee this morning, November 15, 1914. He says:

I know very little of the floods of the rivers, and can tell all I know in a few minutes. I was a conductor on the Southern California R. R. in the early eighties, and from the fact that I was the only passenger conductor at that time and for quite a long while afterward, I met a good many people of note and had many varied experiences.

During the big floods the railroads simply went out of business for the time being. The tracks were washed out and the bridges carried away.

My brother and I came to El Monte in advance of my father to build a house on some land we had bought. The place is still known as the Old Peck place. It was a mistake to have bought the land on the river, but we did not know it at that time.

In 1868 our troubles began with the river. We lost about 150 acres that year, and each succeeding flood took its quota of spoils until there was barely 150 acres left out of the original 480 acres which my father bought.

Lexington Wash was commonly known in those days as Lick Skillet Wash. In those days and even now the river bed was higher than the land on each side. When the floods came down it was no difficulty to direct the water to either side of the river bed. The water would flow readily either way if left alone it would usually split and go in each direction. However, it was not left alone.

In our case, the water began washing away our land and we wanted to protect our place and get rid of the water. Many times I have gone up the river, taking a few Indians with me to move a few boulders about and get the water going the way we wanted it to.

By placing a double row of boulders across the stream it would raise the river water level enough to throw the water over the other way.

Of course, it brought opposition for people on the other side did not want the water either. It finally became serious, and when a man wanted his work to stand it was necessary to stay with it, armed with a double-barrelled shot gun.

There is no doubt that the water once flowed over the Azusa way, in fact right down through the town, or where the town now stands, for big boulders are to be found there now, and there is no question where they came from. Gradually that side of the valley has filled up forcing the river westward. There is a big fall westward and this accounts for the Lexington Wash.

However, the Lexington Wash would never have been if a little care had been taken to turn the water back when it was inclined to overflow to the westward. There was no one in charge and every one did what seemed best for himself. Lexington Slough was a low place and was nearly always swampy. The water seemed to rise to the surface there, and then the New River, so called in that district, would empty into it also.

This New River joined the Rio Hondo and previous to that time Rio Hondo carried very little water. Even today it would not be difficult to turn all the water down the east branch of the San Gabriel river. We used to call the Lexington Wash or that branch of the San Gabriel river, North River.

From the fact that the Reed ditch was located down at Four Corners or Covina, as it is now called, shows that the water would easily flow in that direction.

There seems to be a material that cements the gravel and boulders together making a good river bed which does not wash readily and this probably accounts for there being so little channel as there is for the San Gabriel river. There is lots of fall and the water is carried away rapidly. If the river was confined between banks I do not think it would wash very much on those big boulders! On the more easily moved soils, such as the silt and sandy soils it would be necessary to plant some kind of trees to hold the banks. We planted lotus trees along our bank of the river to give us protection and it was very successful. We planted about three rows of trees and strung barbed wire along the front to help afford protection.

During the floods one could hear the boulders rolling and grinding in the bed of the stream. These would pile up down the river. To keep a channel for the river it would be necessary to maintain it as any other business, and this could be largely done by leasing the channel rock crusher companies, who would place their plants at convenient places along the channel to keep it cleared out. Of course, further down, the sand and trees would have to be taken care of.

There will not be much trouble in controlling the waters in the upper part of the San Gabriel, that part on the gravel cone, and

at one time perhaps $2500 dollars would have taken care of the channel had the people gotten together and done it. But in the lower part of the valley better protection must be given.

In 1882 or 83 the floods threatened El Monte and the people did get out and do enough work to protect the town. It looked for a while as though the hotel would be in danger. The way they felt about it was that it would never do to have the hotel threatened for the bar was located in the hotel. That much they would do, but to go up the river 7 or 8 miles was too far away from the bar to carry on much work.

My father had ideas far ahead of his time on the river control. He advocated river control and took it up with with supervisors. Many times in an effort to get action. First he wanted to impound the water in reservoirs, if possible, and also to construct a river channel and keep the river there. Although he could never get anything done he said it would eventually have to come to that.

When we first came to El Monte we thought we were in a dry section and the locality was considered almost a desert. We put down a well and had to go 60 feet before getting water. About 20 years later we put down another well and found water at only 10 feet depth. The water in the first well also rose to that level.

While the water level rose at their place it sunk below El Monte, and I have never understood the reason.

Of the two rivers, the San Gabriel carries more water than the Los Angeles. Naturally too, the San Gabriel caused the greatest amount of damage in the lower valleys.

The San Gabriel river used to flood the valley near Los Cerritos then cut across the valley to about where the Dominguez pumping plant is now located, break over the S.P. R. R. tracks and on into Nigger Slough.

When Nigger Slough was full it covered about 5,000 acres of land. Branches of the slough would back almost into Redondo on the west and easterly to the country road. When the slough was full the water would then back in over the alkali and salt flats near Long Beach.

The bridges at Watson's Crossing was merely an outlet for Nigger Slough, when the floods began to go down. There were times when the water would flow through the bridges up into Nigger Slough and then out again. There was only one opening that amounted to anything between Dominguez and Watson's Crossing and that was this bridge. While there was an opening at Elftman over the Compton Creek, it never carried all of the water of that stream during the floods.

It was often wondered at where the water came from that came down Compton Creek, and there was no other explanation but that a part of the waters of the San Gabriel River flowed into it.

Often the R.R. line would be impassable between Los Angeles and San Pedro.

In the early days the track between San Bernardino and Los Angeles would be out for weeks. The line across the San Gabriel was so low that every flood would wash them out. In such cases the passengers would be routed over the line around by San Pedro to Los Angeles. Finally, the R. R. company put the tracks up where they were comparatively safe.

The S. P. R. R. tracks in the San Fernando Valley have been washed out many times. The Tujunga has always been a source of great damage.

The floods should be controlled in every way possible; as much of the water should be impounded as could be. The great gravel beds should be covered with the flood waters and made to take up all water possible. The balance of the floods should be confined and guided to the sea, and preferable to the Los Alamitos Bay.

This water should be spread out over the alkali lands and allowed to drop its load of sand and silt and thus made those lands valuable.

The San Gabriel water is excellent and it has often been wondered why this water has never been used for city supplies. It has looked to me that Los Angeles could have obtained this water for its supplies and at half the cost of the Owens River aqueduct.

But, whatever is done should be handled by able engineers and the district should cover all the flooded acres.

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Professor J. M. Guinn, 5539 Monte Vista St.

Was seen at his home by F. Z. Lee, this afternoon, October 30, 1914. He says:

The earliest mention of floods that I have been able to locate in the old records was one of 1811. In 1815 there came a great flood that materia lly changed the course of the Los Angeles river in the city limits. This change was from the easterly to the westerly side of the valley, and approximately where Alameda Street is now located. The old fields were then on the west side of the river, and on the west side of the valley, but when the flood changed the course of the river, the old fields were washed away and destroyed. New fields were made where the river had abandoned its former course and now lay east of the river.

In 1822 there was another great flood which covered all of the low lands and reached a greater height than ever before known. The intervening years between 1822 and 1825 were probably years of abundant rainfall.

In 1825 occurred another great flood which affected a great change in the country west of the City of Los Angeles. Col. J. J. Warner in his historical sketch of the County says: In 1825 the rivers of this country were so swollen that their beds, their banks and the adjoining lands were greatly changed. At the date of the settlement of Los Angeles City a large portion of the country from the central part of the city to the tidewater of the sea, through and over which the Los Angeles river now finds its way to the ocean, was largely covered with a forest, interspersed with tracts of marsh. From that time uhtil 1825 it was seldom, if in any year, that the river discharged, even during the rainy season, its waters into the sea. Instead of having a river-way to the sea the waters spread over the country, filling the depressions in the surface and forming lakes, ponds and marshes. The river water, if any, that reached the ocean, drained off from the land at so many places, and in such small volume, that no channel existed until the flood of 1825, which by cutting a river-way to tidewater drained the marsh land and caused the forests to disappear.

The flood of 1825 changed the course of the Santa Ana river also. Previous to that year the Santa Ana entered the ocean several miles to the northwest of its present channel.

The flood of 1832, although the waters did not rise as high as in the floods of 1822 and 1825, affected considerable change in the contour of the country south of the city. Col. Warner says: The flood of 1832 so changed the drainage in the neighborhood of Compton and the northeastern portion of the San Pedro ranch that a number of lakes and ponds, covering a large area of the latter ranch, lying north and westerly from Wilmington, which to that date had been permanent, became dry in a few years thereafter." The drainage of these ponds and lakes completed the destruction of the forests that Col. Warner says covered a large portion of the south and west of the city. These forests were in all probability willow thickets or copse, the same as were found, until quite recently, on the low grounds near the mouth of the Santa Ana and in the swampy lands of the San Gabriel river. In 1842 occurred another flood similar to that of 1832. This was followed by the drought of 1844-45-46, with its usual accompaniment of starving cattle and horses. In January, 1849, there was an immense flood, but felt more in the Sacramento country. Also in 1851 and 1852 the floods ruined many miners and swept their belongings down from the mountains into the sea.

In October 1859 the thermometer registered 110 degrees in the shade and in December occurred the most remarkable precipitation of rain ever known in the country. It was estimated that one foot of water fell within twenty-four hours. The rivers overflowed and covered the lowlands, doing considerable damage. The starving cattle and sheep, unsheltered from the pitiless rain, chilled through, died by thousands during the storm. Large tracts of the bottom lands were covered with sand and sediment

The great flood of 1861-62 was the Noachain deluge of California floods. During the month of December, 1861, and January, 1862,

according to a record kept at San Francisco, 35 inches of rain fell, and the fall for the season footed up to nearly 50 inches. The valley of the Sacramento was a vast inland sea. In our country, on account of the small area of the valleys, there was but little loss of property. The rivers spread out over the lowlands, but stock found safety from the flood on the hills. The Santa Ana, for a time rivaled the "Father of Waters" in magnitude. In the town of Anaheim, four miles from the river, the water ran four feet deep and spread in an unbroken sheet to the Coyote Hills, three miles beyond. The inhabitant sought safety in the second stories of their houses, and those who were not fortunate enough to have an upper story quartered themselves upon those who had. One unfortunate was carried down by the current and drowned. Some of the vineyards on the southern side of the colony were covered with debris and almost ruined. The Ranchos Las Balses, La Bolsa Chica and lower portions of the Santiago de Santa Ana and Los Alamitos were covered with water. To the affrighted vaqueros who had sought safety on the hills it did seem as if the fountains of the great deep had broken up, and that the freshet had filled the Pacific Ocean to overflowing. The Arroyo Seco, swollen to a mighty river, brought down from the mountains and canyons great rafts of driftwood that landing here in the channel of the Los Angeles River, formed dams that turned the current hither and thither, tearing away the low banks, and spreading the waters still further over the valley, then breaking away, the drift was carried down and spread over the farms below the city. The driftwood brought down by that flood, furnished fuel for the poor people of the city for years. It began raining on December 24, 1861, and continued for thirty days with but two slight interruptions. The "Star" published the following local: "A Phenomenon--on Tuesday last the sun made its appearance. The phenomenon lasted several minutes, and was witnessed by a great number of persons." For nearly three weeks there was no mail; some wag labeled the post office "To Let"

After the deluge, what? the drought. It began in the fall of 1862 and lasted to the winter of 1864-65.

The rainfall for the season of 1862-63 did not exceed over four inches, and that of 1863-64 was even less. In the fall of 1863 a few showers fell, but not enough to start the grass. No more fall of rain came until March. The cattle were dying of starvation. Herds of gaunt, skeleton-like forms, moved slowly over the plains in search of food. Here and there, singly or in small groups, poor brutes, too weak to move on stood motionless with drooping heads slowing dying of starvation. It was a pitiful sight. In the long stretch of arid plain between San Gabriel and Santa Ana there was one oasis of luxuriant green. It was the vineyards of the Anaheim colonists kept green by irrigation. The colony lands were surrounded by a close willow hedge, and the streets closed by gates. The starving cattle, and frenzied by the sight of something green, would gather around the enclosure and made desperate attempts to break through. A mounted guard patrolled the outside of the barricade day and night to protect the vineyards from incursion by the starving herds. The loss of the cattle was fearful. The plains were strewn with their carcasses. In marshy places and around the Cienegas where there was a vestage of green, the ground was covered with their skeletons, and the traveler for years afterward was often startled

by coming suddenly on a veritable Golgotha--a place of skulls--the long horns standing out in defiant attitude, as if protecting the fleshless bones. It is said that 30,000 head of cattle died on the Stearns Rancho alone. The great drought of 1863-65 put an end to cattle raising as the distinctive industry of Southern California.

The flood of 1867-68 left a lasting impression on the physical contour of the county by the creation of a new river, or rather a new channel for an old river, the San Gabriel. Several thousand acres of land were washed away by the San Gabriel cutting a new channel to the sea, but the damage was more than offset by the increased facilities for irrigation, afforded by having two rivers instead of one. The Los Angeles overflowed its banks and carried away acres of valuable orchard and vineyard.

The flood of 1884 and 1886 caused considerable damage to the lower portion of the city. The flood of 1884 swept away about fifty houses, and carried away portions of several orange orchards and vineyards. One life was lost, that of a milkman who attempted to cross the Arroyo Seco. The flood of 1886 was very similar to that of 1884; the same portion of the city was flooded--that between Alameda street and the river several houses were washed away, and two lives lost during the flood of 1884 the Santa Ana River cut a new channel to the sea. Beginning at a point below where the Santiago Creek enters the Santa Ana, new river passes through the fertile lands east at the old river, leaving a strip through the two rivers, varying in width from one to three miles, and discharging the waters (where it has any to discharge) into the ocean about three miles southeast of the old river. Within a period of seventy years we find that the three principal rivers of our county, have all created new channels for themselves, and have materially changed their courses; the Los Angeles, from westerly to southeasterly; the San Gabriel, cutting a new channel from three to six miles southeast of its old one; and the Santa Ana drifting in the same direction twice since 1822. At no very distant day, but probably not since the settlement of the country by the Spaniards, the Santa Ana flowed north of the present site of Anaheim and entered the ocean through Alamitos Bay. Leaving the present channel near Burrell Point and running westerly, there is a well-defined dry river bed that can be traced for many miles. Twice within the last twenty years, during high waters, the Santa Ana has broken into the old channel, and for a time threatened to return to its old bed. The course of the Santa Ana, in former times, like that of the Los Angeles, was nearly due west. The change of the channel in the lower course, of our rivers is due to the formations of deltas or bars across the outlets. The river beds being shallow in high water, the overflow spreadas out over the plains and deposits the detritus of material brought down from the hills and mountains on the land instead of carrying it into the ocean. In course of time the riverway is built up above the surrounding land and the river seeks a new outfall.

In looking over the record of floods we find, as a rather remarkable coincidence, that for a period of fifty years, a flood has occurred every tenth year. Beginning with the season of 1811 and 1812, we find floods occurred in 1822-32-42-52 and 62. To establish a theory of decadal floods there should have been one in 1872 and 1882,

but both these were dry years--floods occurring in 1873-74, and 1883-84. Possibly the great flood of 1868 so confused Jupiter pluvius that he lost his reckoning. The change of direction of the lower course of our rivers has been uniformly to the eastward, thus in a measure paralleling the trend of the coastline. This change has contributed greatly to the formation of new land along the coast. Within the memory of persons now living, the shore-line, at several points, has been advanced into the ocean a distance quite considerable. At the Ballona Harbor the peninsula between the harbor or slough and the ocean has been formed since 1850. Before that time the ocean waves washed what is now the inner shores of the harbor. At Anaheim Landing, in 1869, a lumber vessel ran up the slough past the warehouse and unloaded her cargo. The channel of the slough is now filled up and has become dry land except during very high tides. At the mouth of the San Juan and Santa Ana rivers, at the Alamitos Bay and Rattlesnake Island and various other points along the coast of Southern California the land has encroached on the ocean. This is partly due to the silt brought down by the rivers and partly due to the absence of a literal current south of Point Conception.

While floods in other lands are wholly evil in their effect, ours, although causing temporary damage are greatly beneficial. They fill up the springs and mountain lakes and reservoirs that feed our creeks and rivers, and supply water for irrigation during the long dry season. A flood year is always followed by a fruitful year.

The physical aspect of the country has changed a great deal in the last few years. In 1862 for instance, between the hills of old Los Angeles and Boyle Heights in the low grounds along the river there was a mass of willows and other marsh growth from First Street to the San Pedro Bay. This growth was practically impassable except where roads were cut through.

These willows were allowed to grow up to a size large enough for fire-wood when the people would cut them for fuel. The value of the willows as a protection against floods was not realized until the people began to settle in the low lands. Building houses and putting them in the midst of cultivated land, only to have everything washed away by high water.

When the newcomers, who would not take any advice relative to probable damage from floods in the lowlands, began to complain of their misfortune, old Governor Downey became indignant that they should want people to help them out after being fully warned.

I think that perhaps the greatest flood, although before my time, was that of 1859. All California was inundated that year. In Southern California the greatest damage was perhaps in the mining districts, as the farmers were less in numbers and less extensive.

In that year, the San Gabriel Canyon, where there were extensive placer mining operations going on, was practically swept clean. All of their sluices and machinery were carried away, and much damage done that little work has been attempted since.

The little settlement of El Doradeville was swept out of existence.

The San Gabriel changed its course from east of El Monte to the west side.

The flood of 1862 was another immense flood, and but for the willows and other marsh growth the damage was not so great as the water spread out and slowly drained off.

The flood of 1867-68 was very big and wrought great changes in the San Gabriel river. The channel of New River was cut through and emptied into Los Alamitos Bay. The Rio Hondo or Old San Gabriel and the Los Angeles river united and flowed to San Pedro.

Immense quantities of driftwood were brought down in this flood from the mountains. The people of Los Angeles, San Pedro, Los Cerritos and the surrounding country got their supply of fire-wood from this drift for several years. The lower ccuntry was a mass of water for perhaps a month.

Nothing seemed to be safe from the ravages of the high waters. The old city water works, which was located just above the new concrete bridge on Downey Avenue, was swept away. In those days expedients were resorted to that would seem strange now. During the dry weather it was necessary to sink a pit or sump into the sand to get a sufficient supply of water. This was accomplished by driving piles down and forming a crib by putting planks against the piles. In the rainy season these planks were taken out to give the water a freer passage.

In this flood, however, the water began working the piles loose by the rocking motion, and after they were loosened enough the quicksand and the water would shoot the piles out of the bed of the river as though they came from a catapult.

In 1874 there were big floods around Anaheim, in the Santa Ana River but not so great in the San Gabriel and Los Angeles rivers.

The flood of 1884 did great damage. Every bridge on the Los Angeles river was swept out with the exception of the old covered bridge at Aliso Street. Many people were drowned and between 40 and 50 houses were washed away. Many farms and orchards were devastated. T. J. White had a fine vineyard where the gas works now are. His house, barn and 5000 vines washed away. E. J. Moulton had 30 acres of land swept clean and left almost valueless. The old Wolfskill place was ruined.

When the First Street bridge was carried away an unusual incident occurred. A man was driving a two horse wagon across the bridge when a panel of the bridge in front of him collapsed and was carried away. His only thing to do was to return to the side he came from, but before he could turn around and get away a panel of the bridge behind him also gave way and there he was left in the middle of the bridge, in the air. The balance of the bridge stood until the water went down and everything was rescued.

Where the Salt Lake Station now stands, a fine little orange orchard was swept away. This was as smooth and systematic a piece of sluicing as I ever saw. It could not have been done better had it been directed by man and machinery.

The Cienega to the west of the city was regularly covered by water from the Los Angeles river. There is no doubt that the Los Angeles river once flowed out through the southwestern section of the city through the Cienega and into Ballona Bay. Many old settlers have attested to this to me.

Many lakes are formed during periods when the floods come close together. The subterranean passages and reservoirs are filled by one or two big floods and when followed closely by another the waters gather and are forced to the surface forming lakes. Many lakes appear during these wet seasons around Watts, Compton, Downey, and Artesia; also the water rises in the southwest in the Cienega and Nigger Slough. During the dry seasons these lakes disappear.

These big storms do not come very often, and there has not been any great storm since that of 1889 up to that of 1914. This last storm was not as big as some of the former ones.

There is a mass of material moved from the mountains to the lower lands in these big storms. Year after year the usual rains carry their small load of detritus down the sides of the mountains, depositing them wherever a small obstruction offers a resting place. Small terraces are formed, holes and pockets are filled up and low places are filled in. This fine detritus is partly taken from under boulders, trees and other large objects so that when the big rains come it sends all of the collected material scurrying down the mountains to the valleys, besides undermining and loosening large boulders and large quantities of debris, all of which is carried down by the flood.

This then, is where the immense deposits come from that now make up our fertile valleys; and these deposits must be taken care of in the design and construction of a channel to carry the flood waters. It will be necessary to keep the channel clear of this material that comes down with floods, just as it is necessary to maintain any other structure where there is always change, wear and tear.

It will require big channels to carry the immense floods that sometimes come. The channels must be straight and the banks well protected. Riprap will not be effective. Rip-rap was tried in the eighties and proved ineffective. The railroads were told that it would not do on their work, that it would be so much rock tossed into the stream, to be swallowed up by quicksand, as there was apparently no bottom. The floods came, and erosion began underneath the rocks, which began to settle and finally disappeared altogether.

It is a big work, and its importance is incontestable. There should be prompt action, and the work should not be stopped until the floods are under complete control.

This was very evident to me on my place near Anaheim. During the summer the water would go down, but when the floods came on the

wells would come back to a normal level.

My ideas are based on practical experience, and were it not for the floods our wells would go dry. Of course, this applies to the shallow wells where there is a deep bed of sand and gravel. The water that supplies the deep wells is not so readily affected.

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384
Joseph Smith, Downey, Calif.

Was seen at his home in Downey, November 17, 1914, by R. A. Borthick.

Says he came to Downey in 1876 and has been there ever since.

The Los Angeles River and the San Gabriel got together a little above the County Farm in 1914. He thinks there was higher water for a short time in 1914 than he ever saw before. The San Gabriel left its bed a little above where the S. P. R. R. to Santa Ana crossed the river and first went down across the County Farm and on down through Clearwater and after it had filled up with sand it broke out the other side and joined the Los Angeles River and down it went on the Compton road. He says before the 1884 flood the Los Angeles River used to come down close to Florence and Huntington Park where the old bed shows very plainly and cross the S. P. R. R. to Santa Ana where the steel bridge is and go on down through to the old Tweedy ranch and spread all over the Compton section. He thinks it was in 1889 that it cut a new channel and washed out the Nadeau winery and run over into the Laguna country.

Says he has seen waves in the Rio Hondo 7 feet high anyway and they would act a good deal as the ocean waves do, they would break and you could see the sand dropping through them, especially if they were between you and the sun. And if there was a stick or piece of brush or any kind of obstacle lodged there would be a bar formed in a very few minutes. Says there were hundreds of acres of good ground covered with this sand the river was carrying in the 1914 flood.

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385
Mr. S. D. Thurman, El Monte, Calif.

Was seen at his home, about 1 mile southwest of El Monte, November 16, 1914 by R. A. Borthick. Says he came to El Monte in 1853 with his father when he was a boy and been in this section most of the time since.

In 1861-63 there was 40 days of rain in one stretch, he did not count them himself, but was an old lady who lived with them, his aunt, who always made a habit of keeping track of that kind of thing and she claimed it rained 40 days, and he never knew of her making a mistake on that kind of stuff. The whole country around

El Monte was under water and over as far west as Savannah and all south of the Monte with the exception of a sand ridge that runs from El Monte down toward Old Mission. The place where he lives at the present time was all under water some 2 to 4 feet deep, and in going from El Monte to Savannah it would swim a horse.

In the '61-62 flood the water spread through the willow and brush and did no cutting to speak of only when there was a clear piece of ground sometimes there would be a current or swirl formed and dig out a hole, says he remembers about these holes very well, he was going from Savannah and the water was from knee deep to waist deep and he was picking out his path with a pole and he had found there was a deep hole on the lower side of the road and he met a couple of fellows coming the other way and thought he would have some fun so told them they had better get on the lower side from there on that he had just come across and he had found that it was the better side, and they did not go but a short distance until they went over their heads and they could not see the joke and got rather made about it.

In the 1861-62 flood he was living on the De Carmo place with his father, and he helped the river on the west side of El Monte do what cutting it did that flood, which was not much, did a little cutting down below the road, but he thinks what cutting it did that time was afterward filled up. Says it was flooding his father's place and he and his brother was clearing out a ditch down below the road so the water would make a channel. Says all you had to do was to take a few shovels full of dirt out, and the water would soon make its own channel, but he says the water was cutting over toward El Monte and some of the people over there did not like that very well, and there was a man over there who came out with a shot gun and told me that if I stuck that shovel in the ground again he would take a shot at me. My brother had a gun with him and he says go ahead Steve and stick her in again and lets see if he will shoot and I did and he did not shoot.

In the early times before the 1862 flood there was not much of a channel on either side of the Monte the water came down out of the canyon and split up into several channels above the Monte and ran through the brush and willows and spread all over the country and sank into the ground and stood on the ground. Where were hundreds of acres of swamp ground below El Monte where the water stood the year around knee deep. He says he does not think the main channel of the San Gabriel was 200 feet wide way up above El Monte before 1862. He says the water has run everywhere in that section and the whole country below El Monte is made ground, his place is about 2 feet higher now than when he first got it. He dug a well up above El Monte and got pieces of wood down 150 feet and he says he has heard of other wells over toward Azusa where they got wood more than 100 feet down.

He says an old man used to live just a little below El Monte and a little east of his place on the sand ridge before 1849 told him the river used to run right down the east side of the sand ridge and he says the old man was a very truthful man and he thinks he would not have said so unless it was so.

He says there was not more than 2 inches of rain in 1862-63 and thousands of head of stock died.

In 1867 there was another big flood and the Monte country was all flooded again, but there was no cutting to speak of only what the people helped to cut to save their property. There was some bad cutting donw down toward Old Mission and around the point below Old Mission, but nothing to speak of up at Monte. He says he went from El Monte to San Fernando during this flood and from about where Burbank is now to San Fernando was in water nearly all the way from knee deep to where it would swim a horse.

This was the flood that New River went off from the San Gabriel down near the Old Temple ranch, and went on south instead of making the turn around toward the hill down by Old Mission, and it followed the low part of the country and went down into Los Alamitos Bay.

In 1884 there were big rains again and the country was flooded and at this flood there was more cutting up around El Monte than ever before. It cut a large channel all the way through this flood on the westerly side of El Monte from the canyon to Old Mission.

Mr. Dodson had a house and lot of Blue gum trees washed away, some of the trees were as much as two feet in diameter. The water was 2 feet above the floor of the bridge, there was a span bridge in there at that time. It done some bad cutting on Mr. Thurman's property that flood. There were two floods that season one of them took out a big chunk of ground for him and the next one partly filled it up again.

He says there were cords and cords of wood came down from the canyon in the 1867 flood. There were trees 60 feet long and 5 feet in diameter brought down and in some places it scattered all over the country and in others it stacked it up several feet high.

He says in 1862-1867-1884 the whole lower country was more or less under water. And he says there has been water over all that country that is not mesa ground that was the way it was made. We says there was some work done above the Peck place to keep the water from coming over on the westerly or El Monte channel of the San Gabriel river, but does not think it ever amounted to very much, he says he does not know whether there was anybody helped the water to tear the dam down or not, but he does know there were people from Downey way and others that were interested in keeping the water over in the westerly branch of the San Gabriel. There was quite a lot of fussing and turning of the water up by the Santa Fe Railroad sometime about 1890. He says he himself helped start the westerly branch of the San Gabriel where it is at the present time just west of El Monte, in trying to protect their property in 1862.

He would like to see something done to protect the country from the flood, but says there is no use in trying to do anything unless it is permanent work, says he used to get out and fight the river with the brush and drit and rock dams, but he has found that you just do as well to stay at the house and keep dry, that piles and brush and that kind of protection in this section is no value

whatever, and that you have got to put in some kind of a permanent well if you want to turn or hold the water. Piles and brush protection may be all right below where the water has lost some of its force but up above El Monte it is of no value.

Mr. Thurman told about the earthquake in 1857. He was in El Monte at the time and it shook all the plaster off of the houses that had plaster and shook down big trees. He had been up by Elizabeth Lake before the quake and it was dry and since the quake it has always had water in it.

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390
T. R. Tierce, Downey, Calif.

Was seen at his store August 10th, 1914 by R. A. Borthick.

Was born in Downey in 1871 and has lived there ever since. Says the majority of the water of the 1884 flood went out New River and has done so ever since his recollection, until the last three or four years it has been getting heavier and heavier in San Gabriel.

In 1891 the water broke out of Rio Hondo a little below Rio Hondo Station on the P. E. line to Whittier, at Bangle place, and came down through Downey, and over by the S. P. Depot the water was about three feet deep, and went out down by Downey Cemetery and on down by what used to be known as Newton's crossing, where they forded the New River. In the 1884 flood was water on ground in places around Downey for weeks.

The New River has been working to the east ever since he could remember, and he thinks since his time it has gone about one and one-half miles east. Says he has caught carp a foot long in the wagon road about two miles south of Downey. When he first remembers New River it was running about where Bellflower is now. Says they don't say anything about it but the water came very near coming down through Downey in the 1914 flood, in about the same place it came from in 1891; says he was told it broke through just a little, but the people got it stopped and said nothing about it. There was no flood in Downey in 1914, to hurt, that is the town. The 1884 flood was much the largest in his time.

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391
John Guess, Savannah:

Was seen at his home at Savannah or one-quarter mile northeast from San Berdo Road and one and one-quarter miles west from El Monte on August 20th, 1914 by R. A. Borthick.

He says he came to El Monte in 1852 and stayed a short time and then went to the Lugo ranch which was located north of Compton and afterward known as the Tweedy ranch and he says he was there in the 1852 flood. The 1852 flood according to him was the largest

since that time with the exception probably of 1861-62 which was a great flood. In 1852 the country was full of cattle, horses and sheep belonging to Mexican families and were allowed to run wild over the country, and he says there were hundreds of them bogged down and they gathered together on the sand ridges and high ground for weeks. Says you could not tell where the rivers were as the whole lower valley was a river and it seemed to run as swift in one place as another. Says he does not know how far over east the valley was flooded for you could not get there for weeks and it was two weeks before they could get to Los Angeles from the Lugo ranch by horse back. The ground was so soft and the water so high. There was only a small piece of country in near the old Lugo homestead that was not under water. All Compton over as far as the hills and up the southwest section of Los Angeles was under water. At that time the Los Angeles river bed was along the bluff down about where Los Angeles and Spring Sts. come together and the Los Angeles river was spread out so bad you could not tell where Laguna Lake was. That whole section was a lake. He says in the early times or 1852 the San Gabriel and Los Angeles river beds were not very well defined. They were shallow and liable to run anywhere. The Mexicans drove their cattle across them almost anywhere, especially the San Gabriel below where the Foster bridge is at the present time; from Foster bridge up along the Mesa where the river was called the Rio Hondo the banks were well-defined and the river ran in the same place. He says in the early times the country around Watts and Green Meadows was all flooded and the whole section was swampy country. Could not ride through it in winter time, whether there was a flood or not. It was covered with tullies, swamp grass, and was nothing but a stock country in the summer time. There were very few trees in the lower country in the early times but the whole country was covered with mustard about seven feet high and as thick as the hair on a dog's back and there were just trails leading through it. Says when they were driving through it, would have to climb up on the wagon seat to take a look at the hills to locate where they were at.

In 1861-62 there was another flood he thinks about the same size as 1852 and probably larger. It rained for twenty days in a stretch, without stopping. He was in El Monte in the 1862-63 flood and that whole country in that section with the exception of a ridge of sand in El Monte, which runs through El Monte; the First National Bank and depot are setting on it and it runs on down toward Old Missions--says all the early squatters settled on it, and with the exception of this ridge all El Monte was under water to another ridge about a mile easterly of this sand ridge. Says the water was belly deep to a horse where the high school sets and was as far west as Savannah.

He says the Rio Hondo through El Monte was originally called Lexington Wash and in early times, or up to sometime in the '80's did not carry much water only when the whole country was flooded. It was a draw in 1862 and was filled with willows and elder bushes so thick you could hardly get through it on horseback, and was very shallow and did not look like a wash. He says the whole section of the country was full of willows and some sections were very swampy and there were lakes and water standing in sections of the country

the year aroundd. There was a large swamp between El Monte and the Old Mission, where water stood knee deep to a horse and thick with willows the year around and he thought it would never be of any value, but it is now under cultivation and fine g round. There also used to be a lake the year around some five or ten acres in extent in the summer time near where Savannah is at present, on the old Gibson place, and it would get much larger in the winter time. Says they used to have a boat on it and shoot ducks there and there was a slough run from it off down toward old Mission. Now there is a walnut orchard where the lake was and quite a wash where the slough used to be and there was a lot of water which came down it in the 1914 flood and this was from the Sierra Madre wash and Pasadena country and backed up at the Southern Pacific tracks and washed them out for quite a distance and flooded a section of country that he had never seen under water before, and covered ground with sand that had never had water on it before in his recollection. He says there used to be much more water in the country before then in the 1914 flood, but it was not confined and blocked by pile bridges, good roads, bridges and culverts and railroad bridges, and was stopped by willows and growth of other kinds and did no cutting to speak of.

In the 1862 flood a part of the San Gabriel joined with the water of the Walnut Wash through the Puente Ranch and over as far as Puente Hills and the whole country as far over as Huntington Park was flooded and covered with water. In that section all the low ground for miles was under water. The San Gabriel came down on Azusa side, the Walnut Wash joined it, and came down by Mud Springs. Used to be known by that name. There was a big spring with several acres of tullies at that time, but the waters spread and did not washing.

Old Porsenta Lugo told him that in 1830 there used to be a large lake not very far from Compton--he could not say just where it would be located, for he had not been down in the Compton section for thirty years, but somewhere north and east of Compton. Says old Man Lugo claimed it was quite a large body of water in 1830 with lots of tullies and willows around it and Mr. Guess said when he pointed out where it used to lay in 1852 the water and tullies were gone but there were still some trees scattered in that section.

In the 1862 flood there were some large washes made in between the Temple Ranch and Old Mission Settlement, but were filled up again. He doesn't remember just when with good ground and grew up with willows--thinks it was in the seventies and they were filled up again. Says he used to freight from Wilmington to San Berdo. That is why he remembers so well about the different parts of the country that were under water and cut up for they had to carry their own road making machinery which consisted of a pick and shovel and it would sometimes be days before they would be able to fix a wash so they could get a cross.

The road from Wilmington was down around Dominguez Hill on what is Los Angeles St. and then downWilmington Road as at present and in wet years Nigger Slough would come down below Wilmington Road and stand there until way along in summer time and in winter time

it would sometimes be weeks before you could cross it. In the high water times the Los Angeles river would run down by the hill at Dominguez, and around the edge just below Los Angeles St and follow just a little below Los Angeles St. and go into Nigger Slough and come out again around at the edge of the other hill. In the 1867 flood New River was formed. There was water all down through that section before but it was flood water and never made any channel and never took the main body of water from the other river before. It did not make much of a channel that year but it filled the San Gabriel channel up so that the water continued from where it broke out down by the Old Temple ranch over to the Rio Hondo. With the exception of little overflow in 1884 the Rio Hondo now gets its water from the San Gabriel some three or four miles above where New River broke from San Gabriel, and he says there was not very much of a bed from where the Rio Hondo comes out of the San Gabriel to Old Mission Settlement until 1884. In early times it was known as Lexington Wash and did not carry much water, but the whole country was flooded in 1852-1862-62 and 1867 but there was not much of a stream bed until 1884 when there was quite a channel cut some twenty or thirty feet wide and six or eight feet deep and it has continued to get worse ever since, until now it seems to get the majority of the water of San Gabriel. He lays the blame for the later waters to the rock-crusher people. Thinks the cause of the New River going off down by the Pico place in 1867 was because the bed of the stream up near the Temple ranch had grown up to widlow and filled with sand until there was no channel to speak of that whole section was thick with willows and the water came with a rush and knocked the trees over and covered them with sand and raised the bed of the stream and the water took off straight ahead instead of making the curve.

Says the majority of the water has gone New River way since 1867 until three or four years ago. The 1867 flood brought down thousands of cords of wood from San Gabriel canyon and scattered it all over lower section of the country down as far as Downey and on down below that. On the old Sam Thompson place, close to Revier the driftwood was so bad that he could not farm his place for a year. It took him a whole year to clean up the drift wood. Mr. Guess says old man Lugo used to claim his child was the first American child born in Los Angeles County. His child was born at the Lugo Ranch in 1853. Says he was on the Lugo ranch for two years and did not see but two, or rather one American woman, with the exception of his wife, and she was on her way from Wilmington to Salt Lake to marry a Mormon. He told about some of the dry years-- says in 1859 there was no rain to speak of but the stock held out pretty well. In 1863-64 there was an awful drought and there were thousands of head of cattle and horses died. Going to Wilmington you had to tie something over your nose on account of the stench along the San Gabriel and Slough. You could walk for miles on dead cattle. The whole slough and river down below Bixby hill was full of them. There were fifty men skinning cattle and there were boat loads of hides stacked up. There was no rain at all that season and feed was so short that the cattle got so weak when they would go to the river and slough for water they would get in and mire down and were too weak to get out.

He also told about the earthquake of 1857. Says he was milking a cow and another man close by was doing the same thing

and another man was unharnessing a team of mules, and he heard a roar but thought it was the wind in the willows and did not pay any attention to it, but in a moment himself, the other two men and all the stock were on the ground--not a one left on their feet. There was a stream some six or eight feet wide and a foot to a foot and a half deep right close to where they were and the water was all shaken out of the stream and no water ran in it for quite a while.

Mr. Guess has 164 acres of ground and says there used to be a drawn-down the east side of his place but did not run much water and never did any damage but in the 1914 flood it made quite a wash and overflowed about twenty acres of his ground and covered it with mud and sand. The water that ran in this wash came from Sierra Madre Villa Wash.

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396
S. N. Bise, Compton

Was seen at his home in Compton, October 8, 1914, by R. A. Borthick.

Says he came to Compton in 1873 and has lived there ever since, with the exception of two or three years when he was living in Wilmington. When he first came here the Los Angeles river bed showed very plainly where it ran before the 1867 flood about 2000 feet east of Long Beach Blvd. on Main St. Says he built a bridge across it some twelve feet wide, sometime in the seventies. He thinks it was in the 1889 flood when the Los Angeles river broke into the San Gabriel above the County Farm, and has ran there ever since with the exception of when there were heavy rains it would overflow and flood the country on both sides of the river.

He says in 1875-76 there were heavy rains and the country just east of Compton and up near Lugo was badly flooded. He thinks the majority of the water ran about where Temple St. is at that time.

In 1876 and 1884 the Los Angeles river came down under where the steel bridge is on the branch line of the S. P. and spread out all over the Tweedy ranch. Has seen the water two feet deep in that section and on down and spread over a large portion of what is now Linwood, and the Lugo section of the country and on down and covered the Compton section over very near to the slough on the westerly side of Compton. This was especially so in 1884, not so bad in 1875-76.

In 1884 he was farming what is known as the Snodgrass farm which is just about one-half mile north of Lugo store on the same side of the road and he had a crop of corn gathered and piled on the ground, and went over to San Jacinto to look at some government land and it had not rained much up to that time and while they were over there it commenced to rain and by the time they got back the rivers were running strong enough to swim a horse and the water was

spread all over the country and his own corn was all washed away. The whole country around Lugo, Linwood and through Compton was under water.

In the 1889 flood the Clearwater and Hynes country was much worse flooded than the Compton section. He was in the livery business and had to go over to that section of the country, crossed the river at the Artesia St. Bridge, the Main St. bridge was not safe, and he says on the Compton side there was water but not nearly so deep as on the Clearwater side. The water ran into the buggy in places over near Clearwater.

He says the channel of New River was washed out and made much larger in 1884 than it was before that time. The ground got so soft in 1884 that you would sink down if you got off the road. The roads were also so heavy in 1889 that it took six horses to haul the hearse to the cemetery 2½ miles southwest of Compton.

He says old man Rogers, his father-in-law, came to Compton in 1867 and he had very little money and a large family and he had to take the kind of land he could afford and they shoved him off on a 40 acre piece of ground that was bad alkali land which the river ran through between Temple and Gibson Station and on the south side of Olive. When Mr. Rogers built his house he built up on props, and when the 1867 flood came the water got up in the house some, but the land filled up about two or three feet with sediment and made it one of the best pieces of ground in that section. He says they told him they had already gone to the hills and gotten their supply of wood for the winter and had it stacked up back of the house and it all washed away, but the boys got out and caught logs and driftwood of all kinds as it was going past the house and towed it next to the house where there was an eddy and they got more wood than they lost.

Mr. Bise has a well 223 feet deep on his place just about 200 or 300 feet north of Main St. and just back of the business blocks of Compton on the bank of Compton Creek. The well has flowed all the time this year, but there is usually two or threemonths in the summer time when they are pumping, that it does not flow. At about 90 feet they strike a small strata of clay and above this strata there is water gravel that used to flow all the year but does not flow any more only in very wet season. The next strata comes at about 220 feet, the water is clean and good water, just a little inclined to be hard, and both stratas are the same kind of water, at least you cannot notice any difference.

Mr. Bise says that Compton Creek has always had water in it by his house but has been very little for several years and does not continue very far above him, but several years ago it was very strong and ran quite a stream.

He lived in Wilmington about two years and he says the water they get in that section is about 1200 feet deep and is reddish color and very soft and warm. The water they get above this is not reddish and is brackish and not very much of it. They strike strata of clay at about 1200 feet level.

In a well south of Compton they drilled through a log 1200 feet down.

In the 1914 flood the waters cut out great ditches down below Olive and Artesia Streets about where the Los Angeles river ran when he first came to Compton.

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399
Mr. J. J. Morton, R. F. D. 1, Box 16, Compton, Calif.

Mr. Morton was seen at his home, October 9, 1914, by R. A. Borthick. Lives on Main Street in Compton, between Long Beach Blvd. and Gibson St., on north side of Main St. Came to Compton in 1867 and has lived there ever since. Was elected Supervisor in 1876 and served to 1880.

He says that in the winter of 1867-68 the San Gabriel river broke over and run into Alamitos Bay; that on the night of December 24, 1867, it rained 12" and continued to rain more or less every day for 30 days. He says in the year 1867, when he came to Compton with his father they purchased quite a tract of land from Gibson and Temple at $5 per acre, but afterwards had to settle with the San Pedro Rancho heirs to get a clear title, and he says when they bought the ground the main channel of the Los Angeles river was running through the ground, for they wanted the ground where the river ran on account of the water, so they bought either side of the river bed, which bed was well-defined at that time, he says 100 yards or more wide, and from 7 to 9 feet deep, and as pointed out by him at the present time just west of his house, or about 2000 feet more or less, easterly of Long Beach Blvd., and running southwesterly to the point of hills at the Dominguez place, then around the hill to a place a little below where Los Angeles St. crossed the S. P. R. R. and on around the hill to Nigger Slough in big flood times.

He says the 1867-68 flood formed a lake covering several hundred acres of land at least a mile and a half square, above and between Gardena and Los Angeles on the old Amastoy Place, and was known as the Amastoy Lake and he thought would always be there, but disappeared, he does not know just when, but was there several years.

He says he has never seen the water run over to Ballona country, but is positive it has done so, as it was very near high enough in 1867-68 to do so, and every indication points that it has done so.

In the early days of his time all of Watts and Willows were swamps, sloughs and tullies, and where the black soil in Watts is was a tullie and peat bed. He says some people used to cut and dry that soil and burn it. He says it afterwards dried out and they burned it off and cultivated it.

During the 1867-68 flood he and his father and family lived in what they had built for a barn over close to where the Long Beach Blvd. runs, just a few hundred feet south of Main St. in Compton and it was six weeks before they could move the family and household

goods out. He says they had some cows and he had to go over to the ground that was not under water to milk them for his young children; it was considerably over his waist and had to hold the bucket up over his head to save any of the milk. He says this same ground where the cows were was not under water in 1867 but was under water in 1884.

He says when the big water came in December 24, 1867 it came in a rush and looked like a wall two or three feet high; the country was covered with mustard patches which a man could hardly walk through--higher than a man's head, and the waters gathered that and brush, and he claims thousands of snakes, squirrels and rabbits, and the next day the bed of the stream was practically level with the rest of the country, and the brush, mustard and sand went on down to Rattlesnake Island, and filled up thousands of acres of sloughs, and connected the island with the main land.

He says they went up above Compton and tried to turn the water back into the old channel, but could not do so.

He says in 1867, when he first came to Compton you could see only two trees in the whole valley, one of them is still standing (the landmark) on the north line of the Rancho San Pedro, both trees were sycamores. In the spring of 1868 he says the willows came up nearly as thick as the mustard was before. He says the flood brought driftwood down the San Gabriel to the mouth of the canyon, and spread out over thousands of acres, known as the Old Dalton Place, and that there were thousands of cords of wood, some trees 60 feet long and four feet in diameter. He got all of his wood from there for two years and most of the wood for Los Angeles was gotten from there. He says orange orchards cover the same ground now.

According to Mr. Morton, the San Gabriel river used to divide and sink and spread out about where the El Monte is now, and then below there start off again.

He says the people imported a lot of carp about 1878-79 and everybody that had a lake or pond got some carp and stocked them up and in 1889 was overflowed and their ponds washed out and the fish were carried down to Nigger Slough and when Nigger Slough began drying up some years later the fish commenced dying and made such a stench the supervisors had to hire men to clean them up and burn and bury them.

He says the U. S. Government had a ditch taken out of the San Gabriel somewhere up about opposite Downey, dug by the soldiers, or for the soldiers down at Drum barracks. The ditch commenced somewhere about opposite Downey and followed along up on the bank of the San Gabriel and about one-half mile east of Lugo and when it got to Compton it was a little piece east of his east line and on down to the point of hills at Dominguez and joined another ditch that was taken out of Compton Creek above Compton and ran down through Compton about where the bank building is at present. At the point of the hill where the two joined, there was a wooden flume built to carry them across the flat; the flume was some twenty feet off the ground in some places and about four feet wide and two feet deep and he says he does not remember but it seems to him the flume went

from the point of hills into Drum Barracks, might have run part of the way in open ditch. His recollection of the ditch that they took out of the San Gabriel was some four feet deep by four feet across at the bottom. He does not know when it was built, but the flume was in good shape when he came here and he says he was told they never got enough water through it to irrigate a garden patch. Says he got lumber from the old flume for a number of years after he came here. The work was done by Ge. Banning and cost thousands dollars.

In the 1889 flood was the time the Los Angeles river went into the San Gabriel up above the County Farm and the whole country was flooded.

In 1876 there was a bad flood. The water was so deep between his place and Compton or near Long Beach Blvd. that he had to put his feet up on the neck of the horses to keep them out of the water. That flood was particularly bad in the section of the country near Lugo and a part of what is now Linwood.

Mr. Morton thinks the whole section around Compton that has been overflowed, and the most of it has been overflowed at one time or another since he has been here, has been filled from two to four feet. He says in 1867-76, 84, and 89 the whole section of Compton was more or less overflowed but says there were sections of it in one year that would not be under water and in other years the section that was overflowed would be filled up so much that it was not covered in the next flood. He says in the 1889 flood the ground at the school house at the corner of Main and Gibson Sts. was not covered with water and in the 1914 flood the water was about three feet deep.

In the 1914 flood the water got very nearly to Long Beach Blvd. but was very shallow, only about eight inches deep at his house, and the water was from his house east over past Clearwater and as far north as you could see and as far south as you could see.

Mr. Morton says he fenced the piece of ground where he lives sometime in the seventies, drove posts and put on the two boards, the lower board some two to two and one-half feet from the ground, and when he took it out several years ago the majority of it was filled up to the top of the first board. He says that is why he thinks the majority of the country has filled from two to four feet. Mr. Morton says in all the low sections of country down around Compton the soil is from two to four feet deep and then you strike a black sticky substance that looks like vegetation and he thinks it was vegetation, and tullies, and he thinks this section was a lake or swamp years ago. He says the surface of the ground in this section if covered with water becomes about the same as quicksand and that is why he does not think they can do very much about controlling the river with that kind of banks. The sand after it becomes thoroughly wet will move and run very nearly the same as water. Of course not as fast, but it will move much faster than a person would suppose that has had no experience with it. If they can do something about conserving the water by building dams and reservoirs and lakes and holding the peak of the flood back for a

few hours, it will be a great benefit. But if they make a canal arge and deep enough to carry the water and it does carry the water, it will cut down so much up where the fall is heavy that they cannot take care of the banks to keep them from caving and sliding in.

He does not think the flood waters have any bearing on the surface or first plane of water of the valley and he is certain it has nothing to do with the artesian water flow. The artesian water comes from the mountain sources and there is a ridge or hard formation before you come to the ocean and he thinks the hills used to extend all along the coast down by Dominguez and the ridge stops and holds the water and stores it in the valley and when they dig down and strike coarse gravel which allows the water to go through with force, it will rise according to the pressure behind it.

Says there are clay stratas but they are not pressing down on the water as some people seem to think. They keep the water from going down any farther and the pressure behind causes it to raise and it will raise according to its source and pressure. You strike water in quicksand but the water cannot travel through it fast enough to make an artesian flow, no matter how high the source of your water is it cannot get enough pressure on it to make an artesian flow. The coarser your water gravel, the stronger your flow.

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405
Jesse Hunter, Ravier, Calif.

Was seen at his home October 14, 1914, by R. A. Borthick.

Came to the country in 1851 and has been here ever since. He says 1861-62 was the big flood since he has been in the country, did not see the sun for 30 days. The country was ten times as badly flooded in 1862 as in 1914. The water in the Los Angeles River was from Capitol Mills to the bank over where the County Hospital is at present. He says the river beds had a clean sweep at that time, no wire fences or pile bridges, and the stock kept the willows and brush cut down, and the water had a clear right of way.

Mr. Hunter says an old Mexican by the name of Wachen, who lived up near the entrance to Griffith Park in 1824, told him the Los Angeles river did not have any defined bed above Los Angeles City until 1824, just spread and ran all over the flat section of country, and the country was all covered with sycamores, cotton woods, willows and oak trees and grape vines, and in 1824 the big flood came and washed out lots of the trees and made a bed and it has had a channel ever since in that section, It has changed some, washed out in places and filled up in others, but there have been no very big changes. There are still some sycamore trees left.

When he was a boy the country down by Slauson Junction was all grown up to willows and tullies, and they used to go down there to rob birds' nests. The Huntington Park and Vernon country got badly overflowed in the 1862 flood. The Watts and Green Meadows

country used to be swampy, with tullies and swamp grass, and you could hardly get through that country with a horse in the winter time if there was no flood. His father ran stock on that section of the country, and it was good for cattle only in the summer time. Stock would get bogged down in wet times. He has seen the old ditch and flume built by the Government to take the water to Drum Barracks for the soldiers. The ditch out of the San Gabriel commenced a little below Downey and went down between the San Gabriel and Los Angeles River down to the point of the hills at the Dominguez hills and joined another ditch taken out of Compton Creek a little above Compton, and carried across the flat between Dominguez and Watson Mill about 20 feet high in places in a wooden flume. It was built from 1860-71 and he thinks there was a law suit about the water rights.

Compton and the country above Compton used to be full of sloughs and tullies and water holes. When he came to the country he was a small boy, and he remembers he asked his father why the Mexicans always built their houses on the ridges and hills and carried the water up to them instead of building down by the water, and my father said he didn't know, but after the 1861-62 flood he knew why they built on the high ground.

He was living in Los Angeles in 1867-68, and running a livery stable and wood yard where the Anglees Hotel stands at the present time. In that flood the Los Angeles river went down Alameda Street in the city of Los Angeles. The southwest section of the city was a lake as far over as the Cienega country. Says he was delivering wood, and sometimes he would get into water belly deep to his horse. New River was formed in that flood, and the whole section of flat country below Old Mission settlement was a lake with the exception of a few high ridges. The Los Angeles river got very near high enough to go out through the Cienega country.

He says in the 60's the bed of the San Gabriel river was not much of a bed below the Foster bridge, just wandered over the country, but above the Foster bridge the river bed was deeper than at the present time. He says old man Lugo brought 78,000 head of cattle from his San Bernardino ranch some time in the 50's and turned them loose in the valley and they kept all the willows and brush and grass out of the bed of the stream. Mr. Hunter says that after New River was formed it carried most of the water up to four or five years a go. The country over between El Monte and Old Mission was a swamp and standing water, there were hundreds of acres of it, and there was where Mission Creek started, and the stream about 20 or 30 feet wide, and not very deep at the Old Mission Settlement.

In 1884 there was much more rainfall than in 1914, and the country was much more generally flooded, and the ground got so soft you could hardly travel in the roads, and if you got off the roads you would mire down. About all the county and railroad bridges were washed out in that flood. He thinks the 1889 flood was about the same size as the 1914 flood but did not do nearly as much damage.

Mr. Hunter thinks the flood water has no effect on the surface strata or first water plane, and is certain it has no effect on the pump or artesian well supply of water. If they had a channel 300 feet

wide, and it was kept clear of everything, and straight, it would take care of most any of the flood, with the exception of a time like 1861-62 and there is not much use to try to take care of a flood like that one.

The surface water at his place is about 25 feet from the surface and the well water he gets is about 50 to water, and they went to 75 feet and quit in good gravel. All coarse gravel from 50 to 75 feet with the exception of small strata of clay some 2 feet thick. The top ground of sediment and sand is about 60 to 12 feet deep in this section, and then in some places you strike a strata of clay, not very thick, and in the others sand and gravel, and in some places quicksand. Says it is all made by the river at some time or other, and has all been overflowed at some time. He would be very much in favor of trying to take care of the rivers.

11/18/14 Mr. Hunter says there has always been fighting about the water rights of the San Gabriel and also about the flood water up through the El Monte Country. One side would try to keep the San Gabriel from going down on the westerly side of El Monte and the other side would help the water tear down their dams and protections. But he says he does not know the name of the parties that were mixed up in the fighting, but has heard there has even been gun play. He says the fighting and turning of water has been going on since the 1862 flood.

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408
J. S. Brookshire, Downey.

Was seen by R. A. Borthick, August 1914.

Came to Downey in December, 1867, from San Bernardino with some other people with an ox team of lumber a mule team of lumber. Says he was about fifteen or sixteen years old at that time. Says it had been raining some and on December 24, it began raining hard and the ground was very soft and the stock was about given out, and they were in a hurry to get over to some ranch where there was going to be a wedding at Allen Neighbors. So they unhitched the wagons and left them just a little below where Pico bridge is at present, or just a little below the old Governor Downey house. He says after the flood went down they went back to look for the wagons and right where they had left the wagons was where the main part of the New River was, and it has been in that particular section ever since. He says it did not wash much of a channel, and spread all over the country, and the 1884 flood deepened and made much more of a channel. He says the lumber on the ox wagon was still on the wagon because it was chained on, but it was washed quite a ways down the stream and completely buried and turned upside down with just the hind wheel sticking out. The rest of the wagon was completely buried in the sand, and the lumber on the mule wagon was not fastened on and all they found of it was the front wheels and tongue; found that by the tongue stocking up.

He says the New River is very nearly in the same position from opposite Downey north to where it left the bed of the old

San Gabriel now as in 1867. Says it left the bed of the San Gabriel about one and one-half miles north of Pico bridge.

He says in 1884 from opposite Downey south the New River was running down through Summerset or where Bellflower is now, and at present it is running east some mile or more of where it was in 1884 and he says it has been inclined to bear to the east since the 1867 flood, although overflow water has gone over as far as Hynes.

He says there was a great deal more water in Downey in 1867-1884, 1889, and 1891 than in 1914.

Says he has seen a lake stand in Downey for week in 1884.

He says in going west from Florence years ago, or in early times they used to call that the Cienegas, and the whole country was more or less swampy with sloughs and tullies, especially the old Bullis place. Says there used to be tullies all through the Watts country.

Says he does not know whether any of the water of the Los Angeles river ever went into Los Alamitos Bay before 1914 or not, but says he has seen the Los Angeles river, the San Gabriel and New River flood waters reach one another and the Los Angeles was running into the San Gabriel above where the flood waters joined one another.

He says he knows some of the San Gabriel and Los Angeles waters went into the Los Alamitos Bay in 1914; says it broke out across the lower end of the County Farm and down across Clearwater and Bellflower country on down across Clark Ranch into Los Alamitos Bay. He says the channel of the San Gabriel was practically the same from 1867 to 1914 when the S. P. R. R. bridge to Santa Ana got blocked and turned it west about one-half mile.

He says the majority of the water of the San Gabriel Canyon has run into New River since 1867 up to about four years ago when the San Gabriel has been getting more and more.

He says there was no willows in the river to speak of until after 1867.

The flood of 1884 took all the bridges, both wagon and R. R. bridges, across the New River. It did not take out the Post Bridge or the S. P. bridge at Downey across San Gabriel.

He says in 1889 the Los Angeles river took the S. P. bridge near Cudahy and the tracks for a half mile, also the Nadeau Winery. He thinks the San Gabriel and Los Angeles rivers got the most water in 1889, that is, there was more flood in the west end of the country.

He says he was a young man about sixteen years old in the 1867 flood, and himself and some other young fellows had to herd the stock on a high ridge of sand a little below the fields of Downey because the ground was so wet and boggy that if left in the field and pastures they would mire down.

He says they raised corn principally in that section then and that there were lots of large corn cribs full of corn, and

several of them settled down several feet in the ground on account of the damp ground, and a horse or cow would mire down most anywhere. And he says it was a good deal the same way only not so bad in 1876 and 1884, also bad in 1889.

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410
C. E. Colton, Burbank, Calif.

Was seen at his home in Burbank, October 31, 1914, by R. A. Borthick.

Came to Los Angeles County in 1847 across from Salt Lake City with Capt. Hunter, when he was a boy about 13 years old. He was in Sacramento in 1852 and does not know how bad the floods were in Los Angeles County, but the Sacramento river was about 30 miles wide, and the town was practically washed away, and they moved what there was left of it up the river about four miles above Sutter's point.

He was in Los Angeles City in the 1861-62 flood, and says it had rained early in the season and got the ground thoroughly soaked, and then he thinks it was about the first of January it commenced to rain hard and rained about 30 days without stopping. He says the Los Angeles River in the city was from Alameda St. over to the hill or bluff on the Pico Hts. side. The Los Angeles river split down a little below Vernon, about where J. M. Elliott afterwards owned a piece of ground, or about where Vernon Avenue is at present, and part of it went over into Cienega Country, and on down to Ballona. He says the whole lower section of country was under water; Compton, Vernon, Huntington Park, Watts, Clearwater and the southwest section of Los Angeles, in fact all the low country south of Los Angeles was a lake, and the high ground was so wet they had the expression it would bog a saddle blanket, and there was no such thing as doing any travelling in or out of Los Angeles for quite awhile. He says he made a trip from Los Angeles to San Bernardino in the latter part of February, and he had six of the best mules in the country and about 1000 pounds in the wagon, and it took him six days to make the trip. His was the first team to cross the San Gabriel after the big rain, and the water had gone down considerably, but there was still lots of water in Lick Skillet, commenced about where Savannah is now. The people in Savannah told him he could not make it, but he said he was going to try, and he started and got out in the water about knee deep, and one of his mules got to cutting up, and he got out to straighten her out, and she jumped and knocked him into a hole over his head, and he got out and decided he had better not risk it with his mules on account of quicksand, so he got a man with four bulls to hitch on to his wagon and pull it out on the other side of the Monte. He says there was water from one to four feet deep from Savannah to way the other side of El Monte.

Old man Compton was building a house down at Compton before 1867-68 flood on stilts about five feet high and he asked him if he thought it would be high enough, and he told him he thought he would make it about one foot higher, and he did, and he says it was

not much too high when the high water came.

They used to talk among themselves when they first came and wonder why the Mexicans were such fools as to build their houses on the hills and pack their water, instead of building close to the water, but they knew after the 1862 flood.

He says it was current report that there were over 65 inches of rainfall in 1861-62 and he has heard several men say they kept the rainfall, among others, old man Wolfskill.

Percenta Lugo's father, they called him Grandpap Lugo, told him his father told him San Bernardino was a large lake when he first came to this country and had no outlet to the sea, and there came a big snow and covered the hills, and then warm rains set in and continued for weeks, and all the snow melted and came with a rush and forced an outlet to the sea, and he claims up to that time there was no Santa Ana river.

He says Glendale, and the section of the country along the foothills was more or less covered with oak trees and prickly pears as late as 1860; has hauled wood from Glendale. The Verdugo wash has changed some since he knew it. It used to cross the San Fernando road about 1/4 of a mile south of where it does at the present time, and in the heavy rains part of the water used to run down what is now Verdugo road.

There was quite a lake in Eagle Rock where the street car runs and the business section sets at the present time. There was no outlet to the Los Angeles river until one was made, down by where the Handorff dairy is, or about where New York Boulevard ends, and on down close to where the Eagle Rock car line runs, and across the San Fernando Road and S. P. R. R. tracks into the Los Angeles river.

There was also a small lake or pond in Monte Vista, with quite a bunch of tullies, but it would sometimes dry up in the summer time.

He says Nigger Slough used to cover much more ground in the wet season than it does at the present time, or has for several years. It would spread out and cover a part of what is now Gardena and Strawberry Park, and go down as far as the Wilmington road in the flood times. It got very nearly high enough in 1862 to go out the slough into Old San Pedro, down by the Old Tomlinson landing into the Bay.

The Government took a ditch out of San Gabriel some where above Compton, and one also out of Compton Creek above Compton, and joined the two down at the point of the Dominguez Hill, and carried the water across the flat in a wooden flume and then in an open ditch to Drum Barracks for the soldiers. He thinks it was built in about 1862, and he says the flume was about 20' above the ground between the hills, and remembers driving under it lots of times. General Banning was the contractor.

In 1847 he has seen deer, elk, and antelope in the San Fernando Valley. One could hardly cross the valley on horse back, you would have to go around the sloughs and water holes, and the washes were

much deeper and not nearly so wide as at the present time. There were lots of water holes and sloughs between Burbank and Lankersheim. The Pacoima Creek used to run straight down through where Van Nuys is at the present time, in 1850 and that section of the country always got flood water in flood times, either from Pacoima Wash or Tujunga Wash. There was a lot of country between Burbank and Lankersheim and on above that that was very wet and swampy until it was drained, and some 18 or 20 years ago.

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413
Mr. George H. Blount
18th & Loma, Long Beach, Calif.

Was seen by F. Z. Lee, this afternoon, December 1, 1914, while on his work. He says:

I came to Long Beach in 1890 and soon after began work with the Salt Lake Road. When the road was first built over onto Rattlesnake Island, they put in a pile opening quite a good ways west of the present draw bridge. This opening was perhaps a 70 foot pile bridge.

The sea at this point sets up a rather peculiar notion and especially when there is any heavy seas, or the wind blows from the southwest. The motion is in the form of a curren which runs almost parallel with the beach line, but just a short distance east of this bridge, seemed cut in against the shore. It formed a sort of whirlpool there and continually caused us trouble in maintaining the track. In fact sometimes it would eat into our embankment and during one night would set out a hole as much as sixty feet long. We were continually working with this piece of land to save the track, and especially during the high tides in the summer, when it seemed worse.

We tried driving wing-jetties along the shore to turn the current away from this point, but only partially succeeded for it was hard to maintain these works. The piles would be eaten off and the jetties smashed by the waves with their high tides.

The current and winds were instrumental in forming a sandspit in front of the mouth of the San Gabriel River, thus forcing the river further east all the time. This caused a current to set in which cut out the tracks. Finally we put a dam across the narrow outlet of the San Gabriel River and stopped the flow altogether.

This put all of the water from the San Gabriel river into Cerritos Slough and from there into San Pedro Harbor. This dam was in there about ten years before the Salt Lake R. R. was compelled to put in the draw bridge which now spans the entrance to Long Beach Harbor.

During all of this time it did not seem to make any difference so far as the flow of the San Gabriel river was concerned. In the floods no damage was ever done, and the flood waters passed on over to San Pedro without any trouble.

It is true that the Salt works had to protect themselves but they did this by building a levee and turning the water away from their works.

The San Gabriel River has always flowed down the valley about where it is now. In 1910 it did split and part of it went over towards the Dominguez wide but as a rule the river has always been on the east side of the valley.

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415
Mr. H. B. Rice, Compton, Calif.

Was seen at his home on Clive Street, about a mile east of Compton. He has lived on his place for more than forty years, and has been a witness to some big floods.

The floods, before the R. R.s built their lines across the drainage of the valley, did but little harm. The water spread out, and its movement was much slower than now. There were not so many farms, not so much land under cultivation. No one thought of the floods damaging then. They were accepted as a part of their life, and looked upon the floods as beneficial to the lands, as it left its deposit of silt, thus enriching the land. Wherever the floods covered lands affected with alkali, it leached it out to a certain extent and left a deposit of silt, thus really making the land good, while before it was considered of little value.

This is the case with a great deal of land around Compton. There were marshes, swails and even lakes, which have been filled, or partially filled so by these floods, besides a great deal of alkali land which has received a deposit ofsilt from only a few inches to two or three feet. When Mr. Rice came to his place it was half covered with willows and marshes.

But now nearly everything is changed. The railroads in the last few years have built their lines across the valley, and their embankments have acted as dams. The bridges have been too few, and in many instances, to small to permit the water to get away. Sometimes the bridges would choke up and then the water would collect until it broke through the railroad embankments some other place. Then the water would rush down the valley and wash away the soil and in many cases completely ruin the land by cutting big washes right through it.

We cannot do anything for we do not know where the water will go. It looks as though, from the way the floods acted last winter that the water would break further west and go right down through Compton. That would do great damage. It makes a new channel each new flood, so it is a very uncertain state of affairs.

The trouble is that lower down below us, the water gets a channel started and then cuts back.

Mr. Rice does not see how they could make a channel that would carry such floods as they had last winter, 1889 or 1884.

Should it be possible to make a channel large enough to carry the floods, it would soon fill up with debris from the mountains, and then break out in a new place.

That is what has made this valley, the deposits from the mountains. Of course, it has taken centuries to do it, but the same principle is working today as then. In these big storms the big boulders can be heard rolling and grinding and churning down the bottom of the canons. This is where the sand and gravel comes from. The finer materal comes from the mountain sides with the big boulders, and the water carries all to the lower ground.

As the velocity slackens up it drops the heavier material such as the boulders, then the gravel, sand and silt. The fine sand and silt goes the fartherest and is what we get down here. Even what appears to be white sand will in a year or two decompose enough to begin to enrich the land. The silt holds the moisture much better than sand and where it is covered, holds water all during the summer. On the surface it dries out and forms a crust or breaks up into cakes.

In the floods of 1884 and 1889 the valley was flooded and appeared to be a solid sheet of water. There was no damage around him in those days from floods. The water spread out and did not cut the land to pieces.

The floods have carried immense deposits into the San Pedro Harbor. Instead of the U. S. Government making an appropriation after each flood to dredge out the channel and basins filled, they could use this money to make other improvements. The logical place to put the flood waters would be into Los Alamitos Bay, if it was feasible to do so. It would fill up the low lands down there that are now of very little value. It would make lands everywhere more secure and would increase the prices, which have now fallen off $300 and more per acre.

That is the question--can the river be held to one channel? The river has shifted about from one side of the valley to the other, filling in, and as the river bed would become higher than the surrounding land, it would break out and go to the lower lands.

According to the old settlers, the river once flowed down through the west side of the valley near the Dominguez Hill. That side of the valley filled up higher than the eastern portion, and then the river changed. Such was the case when New River broke through and flowed into Alamitos Bay.

It has been said by old Mexicans who lived herein the very early days of the country that the Los Angeles river once flowed out through the Ballona Creek.

The Artesian wells have been the making of the country. They gave it a start. People found they could get an abundance of water for irrigation and so they began to put down wells. Finally so many wells were put down that they stopped flowing, then they put in pumps. The pumps have lowered the water plane several feet and it is still going down, but there is an abundance of water. The wells here go down 130 feet and strike a strata of clay. The first strata of clay is about 30 to 35 feet down. It is of various

thicknesses but usually from 10 to 15 feet. Another strata of sand and gravel is penetrated for 20 to 30 feet. The next strata of clay is somewhat the same as the first and then a deep bed of sand and gravel are struck 30 to 40 feet thick. The coarsest gravel is found in this strata and sometimes the sand pump brings out boulders as big as the diameter of the pump. This water is all white and is good pure water. The deeper the well is, the warmer the water.

It is wondered what a supply of underground water there is here. There are thousands of wells and yet there is plenty of water. Mr. Proctor in drilling a well just north of Los Cerritos hit a pocket or lake, perhaps an underground stream of water, where his tools dropped twenty-five feet. Many wonderful things have happened. There are several instances where the well-drillers have struck red wood trees, pine knots, etc., down 80 to 100 feet below the surface.

The wells all around us here are shallow wells only going down about 130 feet.

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418
Jose Silva, 3 miles South of Puente.

Was seen at his place by F. Z. Lee, this morning, Nov. 24, 1914. He says:

I grew up around El Monte working as vaquero on the old Baldwin Ranch, but was too small to know much about the flood of 1867-68.

I never really knew much about the changing of the San Gabriel river to the west of El Monte. We have always known the San Gabriel to pass over to the Bassett side and think that is where the river has always been and where it belongs, although there are a good many people who think that it should go over west of El Monte, and who will object to all of the water being cut off and turned to the Bassett side.

In 1893 was the first time the river really broke through and carried much west of El Monte. I have heard that many of the old time Americans have put up small levees of sacks and sand to turn the water from one side or the other according to where they wanted the water to go. Mr. Peck used to turn the water to the west while Mr. Dodson wanted the water to go through the east side. There was some strong words about it and sometimes a man would have to stay on his work with a shotgun to insure its staying there. I have heard that Mr. Durfee was interested too, but I do not know any of the men who did the work.

The river has broken over to the west three times since 1893 and always destroyed a lot of land and washed away things. I have seen the water flood and wash out the Parmer place and also that of Cruz Algitre and Antonio Algitre.

Where the San Gabriel River began to divide and go off to the west was very shallow and did not take much to throw the water in that

direction. When the water was running it was easy to turn the river either way and a man with a pick or shovel could easily turn the water.

The Rio Hondo was never much of a stream, only two or three miles long and running into the San Gabriel just below the Old Mission bridge. It got its water from the swamp lands below El Monte.

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419
Mr. Walter P. Temple
West End of Mission Bridge, El Monte

Was seen by F. Z. Lee at his home this morning, November 23, 1914. He says:

We have always understood the old and original San Gabriel River to be the one down the east side of El Monte or Bassett way. The break or branch down the west side of El Monte was a new wash which first broke over in 1871. There were efforts by various parties to turn the river back to its old channel but there were other parties who wished it to continue to the westward and who would undo or help to undo the work of the first parties. It became serious for a time and force was used in the way of shot guns to maintain the levee built. But none of this water belongs on the west side, and really should be kept to the eastward. It would not be right to have the people pay for two channels when one is really all that is necessary.

Lexington Wash got its name from Lexington, which was once the name of El Monte. There were a lot of Kentuckians in there and they gave it the name.

Rio Hondo never carried very much water. There was never enough water to cause any washing although the water from all the canyons from Pasadena to the San Gabriel canyon flowed into it. In early days all the lands above our place here up to El Monte were low and swampy. There was a very heavy growth of willows, tules, and blackberry vines over all. It was almost impossible for water to have washed anything or to have had much difficulty in gaining velocity. When the big rains came the water drained off slowly and did practically no damage.

Now that more land is being put in cultivation all the time when the rains do come, there is no obstruction and the result is that the water comes down with a rush and washes away our valuable soil.

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420
Mr. Victor Manzanares
West Side of Old Mission Bridge, El Monte

Was seen at his home by F. Z. Lee, this morning November 25, 1914. He says:

The fathers first settled at a point about a mile below the bridge here, but did not remain there very long, when they moved to about a half mile above here. The soldiers were the first to be taken

care of, and especially their arms and ammunition, the powder. A powder house was built of adobe.

When the Fathers moved the mission to its present location, the place gradually fell into ruins. It was in the old powder house, the only building left standing in 1857, where I was born.

The flood of 1867-68 was very great, and changed the course of the San Gabriel River below to what is called New River, which empties into Los Alamitos Bay. The whole valley was practically covered with water that year. No damage was done to amount to anything as the water spread out and did not run so fast as last winter. The reason for that was in those days there was lots of brush and trees everywhere. There were also many swamps and some lakes which all helped to keep the water from running off so fast.

But to show that there has been great floods here just above my place along the banks of the old Rio Hondo, we have found "Alamos" four feet in diameter, and other kinds of trees as well which were very large. There used to be willow trees in the marshy land here in the valley 3 feet or more in diameter. These, of course, have now all disappeared.

The San Gabriel River never flowed over on this side of this valley until 1867-68. It broke over some in those days but the most was done by men who wanted to protect their land which was being washed by high water on the east branch of the river.

There used to be some trouble between the Americans who then were trying to turn the river either to the east or the west. Sometimes some men would go up above El Monte where the river divided, and put a dike or bank across the river to turn all of the river to the east or back into its original bed. Other men would find it out and go up there and tear their work down and turn the water down the west side, which would come down and join the Rio Hondo. There was some bad feeling about turning this water from branch of the river to the other and some times it was necessary to guard the work with a gun to get it to stay there. I know three men who were sent up there at night to break one of these levees. One man is in Idaho, another is in Montebello. His name is Nepomuseno Romirez, sometimes called Cheno Romirez.

That has been a long time ago and nearly all of those old fellows are gone.

But we have always called the channel east of El Monte, near Bassett, the original and only San Gabriel River. This other branch was never called the San Gabriel river by our people. The Rio Hondo we always thought of as an arroyo, nothing more. It was only a drain from the swampy lands between here and El Monte, and was only a couple of miles long.

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422
Mr. George W. Burton, Times Office

Was seen at his desk in the Times Building, this noon,

Aug. 12, 1913, and remembers many things about the floods of 1884, 86, 89, etc. He referred to papers published in 1884, but I was unable to locate them in the Public Library.

However, in the 1884 flood Mr. Burton says every bridge except the old covered bridge across the river at Aliso St. was carried away. There were from forty to fifty houses carried away in the lower part of the city. Many lives were lost. The river was solid from Alameda St. to Boyle Heights. There was no railroad service between Los Angeles and San Francisco for six weeks. Mr. Burton well remembers this for he was operating a printing office here then, and had a very large contract for printing on hand. He had ordered the paper for the job from San Francisco. The storm came on and all communication was cut off for five or six days. As soon as the telegraph lines were repaired, he telegraphed to San Francisco to find out where his paper was, and finally made a duplicate order to be shipped at once by boat to San Pedro.

There were hundreds of feet, in fact, almost all of the R.R. track, washed out in the San Fernando Valley. The Tujunga and Pacoima carried immense quantities of water. Whole orchards and groves were carried away. Where the Santa Fe Station is now, a grove of walnuts was completely washed away. Lower down orange orchards suffered likewise.

Alameda St. was the river channel and water came high up on the banks near 6th and Main Sts. The country all through Watts, Compton, Clearwater, Downey and Artesia was a sea of water.

Mr. Burton says the river must be confined and that with solid masonry channels. He cites the rivers of Europe, as the Thames, Seine, Rhone, Tiber and many others where they are subject to over-flow. The riprapping is not sufficient. The rushing waters carry so much sand and silt that as the force impinges on the banks it quickly cuts away. If only riprapped it soon gets started below the foundations and causes breaks and then the great damage follows.

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423
August Wackerbarth, 202 N. Main St.

Secretary to the Los Angeles Pioneers Society, he was seen at his office about noon on the 13th inst. Mr. Wackerbarth is familiar with many of the facts of old pioneer days and knows many of the old pioneers themselves.

He says: The Los Angeles river once flowed near the west bank of the river near the plaza and down where Alameda St. now is. Alameda St. is known to be four or five feet below the bed of the Los Angeles river. At one time some placer mining was carried on right near the plaza, and even now could one go to bed rock, they would find gold. (not relative) He says that all newspaper stories regarding tunnels and the like in Chinatown are unreasonable as the water rises to within four feet of the surface of the ground, that cellars always are filled with water. (Gave me two copies of the Pioneers Annual)

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423 (Taken from the case)
Supreme Court Case No. 19391, Arcadia B. de Baker
vs.
Southern California Railway Company
Vol. No. 990

On page 112 of the report of this case Jose Antonio Arguello testifies: He has lived on the San Antonio Ranch in the Vicinity of the bridge where the Santa Fe Ry. crosses the Los Angeles river. He says "Most of the Los Angeles river flowed when I first knew it, on the other side of the levee where the sun goes down. Below Seventh St. the levee was built in running water. The water ran when it was not obstructed towards the side where the sun sets. When I worked on the levee I worked in the water up to my waist very often. I never knew of the water flowing over the Laguna Ranch previous to the building of the levee. I don't remember the time the river commenced to flow over the Laguna Ranch, but I know the hour when the water broke through there, because I was present. I know Mr. Bassett's place. I know where his orchard was planted, because I helped to plant it. These trees were set out about seventeen or eighteen years ago. The trees were orange trees.

Fruitland joins the Laguna Ranch on the west.

Andronico E. Sepulveda, county auditor in 1876 and 1877. Says in part, "I saw more water in 1884. I saw more water in 1861 and 62 and in 1867 and 68--I did not see it (Los Angeles River) higher, but more water. The river kept changing, the water kept changing from east to west and from west to east; three or four hours it would run on the east side of the river, and two or three hours it would run a heavy volume on the west--that was east of the levee and alongside of the levee. At times during the storm the water changed from one side of the river bed to the other.

"After the water left the levee where it came out there under the bridge, down where the levee stops, the water took the westerly side of the river. It did not change back to the east side after it left the levee. It is a little over half a mile wide below the levee where this break is. It is 300 feet wide where it was confined between the east bank and the levee. And that water spread out over a half mile between the banks of the river below the levee. Portions of the water would be two feet deepp and portions of it less than two feet deep. I don't think it covered from bank to bank that year. I don't think it flowed over the west bank in 1889--Because the water spread to the west, or the east bank of the river I judged there was more water in those years. There was no levee there in 1861 or 1867, or 1884, or 1885. From Seventh St. down to where the end of the levee is now, when I saw the flood in 1861 and 1867 and 1885, the water was about 1200 yards wide, and a portion of the river was wider in 1889; when this water came down there it was confined by a levee. The break was caused by the amount of water that was confined between the east bank of the river and the levee, that in my opinion was the cause of the break."

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Many people think it was the floods of 1884 that carried away the upper S. P. bridge, and this bridge coming down carried away the old Downey Avenue bridge, also some houses on First St. were carried away and some people drowned. The approaches to the Aliso bridge, to the First St. bridge and all bridges except the old covered bridge, etc. It was established by the court that these floods and ensuing events happened in 1886.

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425
Jose Maria de Abila, was born in Los Angeles County and was 72 years of age at that time, 1893. He never knew the river to flow over the Laguna Ranch before. He remembered the floods of 1832, 1837, which were very large and flooded whole portion there on the west side."

"After the floods of 1861 and 67 brush, large sticks and rock washed over where the break is now, and on the ground beyond. After the floods of '32 and '37 and '71 and '78 there was no sand washed over there, but water would go over it, and of course sand would remain.

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425
Juan Sepulveda had lived in Los Angeles County about seventy-nine years. "Had known the Los Angeles River since 1822. The west bank of the Los Angeles River before the levee was built, was west of where the levee now is. Before the levee was built the water ran down the right hand side. The levee is made in the bed of the river. The first flood that I remember was in 1825. The next flood was in 1832--there was another in 1833--there was another one in 1862--there was another one in 1862. The flood of 1825 was a very large one. It was so great a flood that it went against the opposite bank, and on this side towards Alameda St. it was quite a sea; and from the ranch of Mr. Bixbee to the house on the hill belonging to San Juan Dominguez, it was all a sea of water. Compton was a sea, where the town is now--a wash. The flood of 1832 was a very large one. I assisted in the survey of the Laguna Ranch in 1835."

"Alameda St. had a bank at that time three or four feet high. It was this side of Alameda St. the water would cover to the opposite bank. The water did not get that high in 1832 because the waters made an explosion of the Arroyo Seco and carried away a lot of orchards, and a house belonging to Mrs. Vejar."

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426
Ram Valenzuela has lived here since 1828. Lived in San Gabriel prior to 1828. Never knew the river to run over the Laguna Ranch before the levee was built.

"The first flood I remember was in 1832. That was a very large flood. It took away a number of orchards. The flood of 1832 was larger than the flood of 1889."

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426
C. H. Forbes:

Came to Los Angeles in 1857. Had continuous management of the Laguna Ranch since 1866.

There are 116 acres of the Laguna Ranch lying within the city limits--The highest flood that I have known was the flood of 1862. After that came the floods of 1868 and 1884, and this flood of 1889. Heavy rains have the effect of filling up the bed of the Los Angeles River--The river touched the Laguna Ranch at the south line of Fruitland. I have known it to flow there always until 1889.--The deepest cut made on the Laguna Ranch was about twelve feet, and in some places it was a quarter of a mile wide. I think the soil in some places on the Laguna Ranch is ten or twelve feet deep. The land where the river washed through was very good land. There was a little alkali on the land. I think there was about a thousand acres washed out on the Laguna Ranch. The line where the river flows now is good corn and vegetable land. I would average the land that was cut out at $200 per acre. I was renting the land that was cut before the flood at $12. per acre, per annum; now I can't rent for anything; it is worth nothing. The sand in some places is four and five feet deep. I have had posts dug on purpose to find out the depth of it. We have tried to plant corn on it but it won't grow. I never knew water flowing through the Laguna Ranch before the flood of 1889."

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427
Jose Perez was born in 1825. Says that the waters of the Los Angeles river flowed into Laguna Rancho in 1862 and from there flowed on into the San Gabriel, but did not cut any. Merely flowed over the land and did not damage at that time. It was only an arm of the river that flowed over that way at that time. The river ran at a place called Sancal on the Rancho San Antonio in 1862.

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427
Sylvester Rogers:

Lives about a mile southeast of Compton. Knows of some of the big floods.

"About Christmas 1867 the big rains began, and flooded a great deal of the country. During the 1867 flood the water broke through and ran across the Laguna and then down through Mr. Lugo's and where Judge Thomas lived, after it came to Tweedy's and connected with the San Gabriel and they both ran together. It caused a great deposit of debris on about an average of two feet deep.

The neighborhood of Compton was frequently overflowed by waters of the Los Angeles River. I consider that the deposits left by the overflows increase the value of the land. The overflows raised my land about two feet, and the effect have been about the same upon the adjoining land. Every farm there has been benefitted by the floods.

Compton is nearly south from the break. Previous to 1889 Los Angeles river flowed all over the country from the San Gabriel river clear to Compton Creek. When I first moved to my place the Los Angeles river ran right through my farm. I moved there about twenty-five years ago. It filled up that year above my place and has never flowed in there since. After that it ran mostly east of my place--about half a mile--or ran there every flood until the flood of two years ago. As near as I can recollect, the bank of the river where the break now is, was as much as six feet high--At the time of the flood of 1867 in coming to Los Angeles we had to go clear around the Laguna on the east side. We went right up through what is called the San Antonio Settlement by Lugo's and kept near the San Gabriel river until we got past the Laguna. We had to travel away east of where the Southern Railway now runs across the Laguna Ranch. In 1867 the water went through by the lake, where the break is now. I do not think there was any break in 1867. I think the water just overflowed the banks. It did not make a break--just overflowed the banks and ran across the level country there, until it came to the lake, and then it turned and ran right down by the Lugo Ranch. I don't think the water flowed, but the water stayed on the Laguna Ranch at that time about a week, then most of it sank back into the old channel when the water commenced going down. The water on the Laguna Ranch at that time did not have any defined channel. It spread out in a thin sheet.

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428
J. C. Newell lived in this city and country thirty-seven years. He remembered the flood of 1862. The flood waters ran all around the Felipe Lugo place towards the Laguna Ranch. He says:

"We thought it was the ocean coming up there. At the time of the flood of 1862 I was living on the corner of Second and Main Sts., right in the city, and a couple of days after the flood I was down there and could not get across the river on horseback. The whole country then and for two or three days afterwards was flooded with water so that I could kill geese right on the upland, the bench land that ran to Felip Lugo's ranch. The water ra n all over everywhere. There was water on the other side, there were creeks coming down that carried water and there was one that came from the other way from below Felipe Lugo's from the Los Angeles river--The water was going around the point below Lugo's and was striking off in the direction of the lakes upon the Laguna Ranch. Two or three days afterward, of courseq there was not much current except one or two little places. It was so wide we could hardly see across it. You could see some cottonwoods around the Laguna all right enough, but I don't know whether the ~~was was~~ clear to it or not--I also recollect the floods of 1867-68. I think perhaps it was both years, and I know that at that time the water ran in the same place, it did before--The water at that time came from the Los Angeles river. I never saw any difference in the sand or debris from 1862 and after 1868. I was down there picking up driftwood and never saw any difference. Since I was on the stand last I have been out on the Laguna Ranch and where the new channel is now--where it broke over in 1889, and with reference to the sand bank that I testified to on Last Saturday, I

find that the water runs out in the new channel the same place it did in 1862, only it is cut out deeper now, and more water runs in the channel now that it did at that time.

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429
W. F. Barber, Sec. of Company, that owned the dam on Mormon or Brown Canon, at the N. W. corner of San Fernando Valley. Was washed out on the 24th of Dec., 1889. The reservoir was full at the time. There was a heavy rain and the dam went out. Dam was about thirty-five feet high, and covered about three or four acres. Mr. Barber followed the creek down and never could figure out how it got into the Los Angeles river.

Fred Eaton was the engineer who built the dam.

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430
Asa Hunter lived three miles above Los Angeles, right inside the city limits and on the river, or a mile and a half above the junction of the Arroyo Seco and the Los Angeles river.

In 1889 the Los Angeles River was four or five feet higher than it ever was before. There was railroad piling across the river and across the stream where the Arroyo Seco comes into the Los Angeles river. The bridge would not hold the water but a few minutes before it went over. Itwashed it out or tore it away. The point where I observed the water higher than I have ever seen it before was about a mile and a half above the railroad bridge, and at that point the river runs along the natural channel that it has always run it. High water occurred in the Arroyo Seco every three or four years and some were closer and some farther apart. The Los Angeles river is larger than the Arroyo Seco and flows from a larger water shed. The two streams unite right below the railroad crossing. When the Arroyo Seco is at flood it brings boulders and brush down. I have seen boulders come down there which weigh 150 to 200 pounds right where it goes into the Los Angeles river. It would also bring down sand and timbers. The Los Angeles river is all quicksand; the Arroyo Seco is not so much. That was the flood that carried away the S. P. bridge; the upper bridge. That bridge was carried away twice. Since before the flood of 1889 and again in the flood of 1889.

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430
George W. Townsend, lived in the Vernon district in this county. He lived south, and about a mile west, of the break, where the new channel crosses the Laguna Ranch. There is a county road that comes down the north line of that Fruitland district there, and right in here alongside Mr. Bassett's ranch--and between these and the first place on the bank there is a low place there--and mud hole--and was impossible to get in there--I laid out the road on the north side of the Fruitland tract, where it crossed the Los Angeles river. That was six or seven years ago. That was at the same point where the break of 1889 occurred and

where the new channel now is, where the water crossed the bank to the east in 1884.

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431
J. C. Whitaker lived in Los Angeles near the Arroyo Seco. His land ran right across it. Had lived there twelve years and had means of observing the waters in the Arroyo Seco since 1881. As compared with 1881 to 1889 the water was highest in 1889, with the exception that for just a short time. He had just put some twigs in the water when he heard a noise just as if a strong wind was coming down the river and looking up saw a wave rushing down. I thought there had been a cloudburst up in the mountains and concluded everything would go. After this occurred, it seemed to settle down again to the regular rain in a short time. I walked out to the approach to the Pasadena Ave., bridge and it began going at that time. The bridge washed away and we heard the locomotive go down, and we came back by the way of Garland St., and I went into the water to my knees. The volume of water which I saw coming down, when I heard the noise, was about a quarter of a mile above the Sante Fe Bridge, where the Santa Fe crosses the Arroyo Seco, and no obstruction at the point where said bridge crosses the Arroyo would affect the volume of water which I saw coming down the Arroyo at that time.

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431
Mr. John Chapman
Palms, Calif. R. F. D. 71

Mr. Chapman was seen by F. Z. Lee at 211 Central Building, this morning, December 11, 1914. He says:

I was born and raised in Los Angeles, and for a great many years have lived at the Palms. For 8 or 10 years I was road foreman under Mr. Hall, but have had nothing to do with the work for 5 or 6 years.

The biggest flood that I remember was 1889. In Los Angeles there was enough water in San Pedro St. to swim a horse. In the Ballona the water was spread out over a vast territory. It happened at the Palms that there was a couple of feet of water all over the land, and from there to the Ballona Creek there was a great deal of water.

The floods in the Ballona did no harm in those days, for there was nothing but farms in that part of the country in 1889. Should another rain come such as we had that year there would be a great amount of damage done; many houses would be flooded, and washed away--perhaps. And such a rain may come too. This water all came from the water shed west of Main St. and from the Hollywood Districts. None of this water came from the Los Angeles river.

I have been told however, by my people who were here in the very early days that the Los Angeles river once flowed along the bank near Main St., about where Los Angeles St. is, as far south as 9th St., then the river turned gradually toward the southwest and

flowed into the Ballona. My mother was born where the Natick Hotel now stands.

She says it was the custom of the people in thoseearly days to build their houses along the bank of the stream where water was convenient, and that even in her early days there was a line of houses along the river banks as far south as 9th St. Later on there was a big flood, and the river changed its course over to the eastward.

In the flood of 1889 nearly all the bridges across the Los Angeles river were washed away. There was an immense amount of water in the river, for there was water from San Pedro St. to Boyle Heights.

There used to be a great deal more salt marsh land this side of Playa del Rey than there is now. Only a few years ago the tide used to come up nearly to Mesmer Station on the P. E. R. R. That has all been changed now, and the tides are kept out. Where Venice now stands was once a sea salt marsh, and the tides came in there all the time.

The floods should be controlled, but when some of the storms come it looks as though there would not be room enough in the rivers for all the water. There is another thing that is going to help the floods do damage, and that is the way they are putting in the bridges on the highways. I can show hundreds of culverts and bridges that will not carry water even where they are, owing to the manner in which they are placed. The upper end should be higher than the lower end to give it slope and allow the water to wash the sand out--but this is not even done. Many culverts are placed so low the water could not get through them even when they are placed right. There are many of the bridges in our district badly placed, and never will carry the water they are supposed to.

A great deal of trouble is in store for the County on account of the bridges along the good roads and the streets. There used to be a great deal of water in the Cienega, but that has all disappeared. At one time there was only a trail or two near the old Baldwin house where stock could cross, and if they happened to step off the trail, which was not very wide, and was very good at that, the animal was nearly always drowned, for it could not get out of the marsh. Gradually, however, all the water has disappeared.

There was once artesian wells near the Ballona, but they too have gone dry. Some of these wells were 200 to 300 feet deep. The water in these wells was fine, clear water, but just where it came from and where it has gone is hard to say.

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433

E. C. Ducommun, 219-227 Central Ave., Los Angeles

Was seen at his place of business on Central Ave. by R. A. Borthick, October 31, 1914.

His father was an old timer, came to Los Angeles sometime in the fifties, and was always very much interested in the rainfall and

floods of the country, or anything that had any connection with the water supply of the country. Mr. Ducommun says he has always been very much interested himself, and would like to see the flood waters taken care of, and as much of them as possible conserved and saved for irrigation purposes.

He furnished me with a copy of the rainfall kept by his father until his death and then kept by himself until 1896. He says they published it for quite awhile, but the government would not accept it as official; claimed they did not measure it correctly and got too big a rainfall.

Year	Rainfall kept by Ducommun at old Ducommun Home, 527 Ducommun St.
Year	Inches
1872-73	14.
1873-74	24.79
1874-75	21.67
1875-76	26.74
1876-77	4.88
1877-78	19.81
1878-79	11.35
1879-80	20.59
1880-81	13.74
1881-82	12.01
1882-83	13.84
1883-84	43.94
1884-85	10.35
1885-86	28.56
1886-87	16.57
1887-88	26.38
1888-89	52.01
1889-90	23.55
1890-91	16.95
1891-92	29.51
1892-93	8.21
1893-94	15.66
1894-95	9.04

He says he got to fussing with the government and quit keeping it. Mr. Ducommun thinks the 1889 flood was the largest in his time; they got as much as seven inches of rainfall in 24 hours in that storm. He was out in a part of that storm and says the whole lower end of the city was a lake.

EXCESSIVE PRECIPITATION AT LOS ANGELES, CALIFORNIA

for Diffeŧent Duration Periods.

Taken from the Report of U. S. Weather Bureau

Duration	Amount	Date	Time
5 Min.	0.12"	1899, Jan. 2	7.38 P.M. to 7.43 P.M.
"	0.20	1905, Feb. 2	Early A.M.
"	0.15	1906, Feb. 10	" "
"	0.22	1906, Mar. 12	" "
"	0.18	1907, Mar. 5	" "
"	0.14	1909, Jan. 21	Bet. 3 and 4 P.M.
"	0.15	1912, Mar. 4	10.08 A.M. to 10.13 A.M.
"	0.11	1912, Mar. 6	6.23 A.M. to 6.28 A.M.
"	0.14	1912, Mar. 12	11.45 A.M. to 11.49 A.M.
"	0.14	1913, Jan. 15	
"	0.24	1913, Nov. 12	
"	0.28	1914, Jan. 18	Bet. 5 and 6 A.M.
"	0.36	1914, Feb. 18	" 1 and 1.30 A.M.
7 Min.	0.51	1908, Jan. 14	4.16 A.M. to 4.23 A.M.
"	0.23	1908, Feb. 9	6.38 A.M. to 6.45 A.M.
10 Min.	0.40	1913, Nov. 12	
"	0.42	1914, Jan. 18	
"	0.66	1914, Feb. 18	
15 Min.	0.44	1905, Nov. 27	
"	0.48	1914, Jan. 18	
"	0.49	1913, Nov. 12	
"	0.81	1914, Feb. 18	
20 Min.	0.75	1900, Nov. 17	Bet. 12.30 and 1 P.M.
30 Mih.	0.68	1905, Mar. 13	
"	0.68	1913, Nov. 12	
"	1.12	1914, Feb. 18	
1 Hour	1.51	1914, Feb. 18	
24 "	5.12	1913, Feb. 23 and 24	
"	4.26	1914, Feb. 12	

TOTAL PRECIPITATION IN LOS ANGELES DISTRICT

which occurred on the 18th, 19th, 20th and 21st of February 1914

Taken from the Report of U. S. Weather Bureau

Avalon	3.45 in.	Palm Springs	3.90 in.
Azusa	13.26	Palos Verdes	3.87
Bear Valley Dam	10.83	Pasadena	11.44
Chino	4.81	Pomona	9.60
Clairmont	10.92	Redlands	4.26
Cleghorn Canyon	17.85	Redondo	3.51
Corona	4.31	Riverside	2.79
Devil's Canyon	8.63	San Antonio Canyon	12.25
East Highlands	4.85	San Bernardino	4.71
Fillmore	6.44	San Dimas	11.29
Garvanza	9.41	San Fernando	8.88
Highlands	5.68	San Pedro	2.03
Hollywood	6.75	Santa Monica	5.50
Long Beach	3.24	Sierra Madre	15.56
Los Angeles	7.07	Squirrel Inn	16.29
Mill Creek	11.10	Tustin	3.52
Mt. Lowe	19.20	Valyermo P.O.	5.57
Mt. Wilson	19.40	Venice	5.16
Orange	3.55	Ventura	10.28
		Walnut	6.96
		Whittier	5.02

RECORD OF RAIN FALL 1849-1877

YEAR	1849		1850		1851		1852		1853		1854	
Month	Rain fall	Days Wet	Rain fall	Days Wet	Rain fall	Days Wet	Rain fall	Days Wet	Rain fall	Days Wet	Rain fall	Days Wet
July									.04	1	.01	1
Aug.									.46	4	.15	3
Sept.	3.14	3	.33	4	1.03	1			1.12	2	2.41	9
Oct.	3.14	3			.21	2	.80	1	2.28	12	.34	2
Nov.	8.66	8	.92		2.12	5	5.31	12	2.32	11	.81	3
Dec.	6.25	12	1.05		7.10	14	13.20	20				

YEAR	1850		1851		1852		1853		1854		1855	
Jan.	8.34	15	.72	5	.58	4	3.92	11	3.88	10	3.67	11
Feb.	1.77	5	.54	4	.14	4	1.42	5	3.04	16	4.77	10
Mar.	4.53	7	1.94	9	6.68	14	4.86	6	3.51	11	4.64	12
Apr.	.46	3	1.23	8	.26	3	5.37	8	3.12	9	5.00	10
May			.67	3	.32	1	.38	7	.02	1	1.88	6
June									.08	2		
Total	33.15		7.40		18.44		35.26		23.87		23.68	

YEAR	1855		1856		1857		1858		1859		1860	
July			.02	1			.05	2			.21	1
Aug.					.05	2	.16	2	.02	1		
Sept.			.07	7					.03	1		
Oct.			.45	2	.93	3	2.74	4	.05	1	.91	12
Nov.	.67	7	2.79	5	3.01	11	.69	5	7.28	15	.58	3
Dec.	5.76	15	3.75	9	4.14	8	6.14	14	1.57	6	6.16	21

YEAR	1856		1857		1858		1859		1860		1861	
Jan.	9.40	13	2.45	7	4.36	8	1.28	4	1.64	6	2.47	8
Feb.	.50	4	8.59	15	1.83	8	6.32	18	1.60	7	3.72	8
Mar.	1.60	5	1.62	6	5.55	8	3.02	11	3.99	13	4.08	8
Apr.	2.94				1.55	4	.27	4	3.14	8	.51	4
May	.76	3	.02	3	.34	3	1.55	4	2.66	11	1.00	3
June	.03	1	.12	1	.05	1			.09	2	.08	2
Total	21.66		19.88		21.81		22.22		22.27		19.72	

YEAR	1861		1862		1863		1864		1865		1866	
July												
Aug.							.21					
Sept.	.02	1			.03	1	.01	1	.24	2	.11	2
Oct.			.40	2			.13	3	.26	4		
Nov.	4.10	12	.15	3	2.55	5	6.68	8	4.19	10	3.35	12
Dec.	9.54	16	2.35	9	1.80	8	8.91	18	.58	8	15.16	18

YEAR	1862		1863		1864		1865		1866		1867	
Month:	Rain fall	Days Wet	Rain fall	Days Wet	Rain fall	Days Wet	Rain fall	Days Wet	Rain fall	Days Wet	Rain fall	Days Wet
Jan.	24.36	18	3.63	9	1.83	5	5.14	9	10.88	16	5.16	15
Feb.	7.53	10	3.19	10			1.34	8	2.12	9	7.20	9
Mar.	2.20	11	2.06	8	1.52	9	.74	4	3.01	12	1.52	7
Apr.	.73	9	1.61	9			.94	3	.12	1	2.36	8
May	.74	5	.29	2	1.57	4	.63	2	1.46	6		
June	.05	1			.76	5			.04	1		
Total	49.27		13.67		10.08		24.73		22.90		34.92	

YEAR	1867		1868		1869		1870		1871		1872	
July												
Aug.												
Sept.	.04	1			.12	1	.03	1	.03	2	.14	1
Oct.	.20	1	.15	3	1.29	2			.11	2	.21	1
Nov.	3.41	6	1.18	5	1.19	5	.43	4	3.72	9	2.62	3
Dec.	10.69	18	4.34	11	4.31	7	3.38	8	16.74	14	7.25	10

YEAR	1868		1869		1870		1871		1872		1873	
Jan.	9.50	17	6.53	14	3.80	9	3.07	7	4.22	10	2.17	8
Feb.	6.13	9	3.90	5	4.78	9	3.76	10	6.67	20	4.24	17
Mar.	6.30	12	3.14	12	2.00	8	1.29	8	1.64	10	.78	4
Apr.	2.31	9	2.19	5	1.53	4	1.93	5	1.10	7	.52	3
May	.03	2	.08	2	.20	2	.21	3	.16	3	.10	1
June	.23	3	.02	1					.02	2	.08	1
Total	38.84		21.35		19.22		14.10		34.41		18.02	

YEAR	1873		1874		1875		1876		1877	
July	.03	4					.10	1		
Aug.	.15	3					.02	2		
Sept.			.83				.26	3		
Oct.	.68	2	2.73		.22	2	.69	7		
Nov.	1.31	6	5.92		6.73	15	.23	3		
Dec.	10.12	20	.28		3.08	10				

YEAR	1874		1875		1876		1877		1878	
Jan.	4.85	14	6.97		6.41	14	4.36	9		
Feb.	1.83	10	.20		3.96	7	1.14	7		
Mar.	3.55	15	1.03		4.37	11	.91	7		
Apr.	1.01	1	.02		1.04	8	.25	6		
May	.34	4	.11		.18	1				
June	.08	2	1.01		.02	1				
Total	23.95		19.10		26.01		7.87			